

SEQUENCE LISTING

<110> O'Donnell, Michael E.
Yuzhakov, Alexander
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Jeruzalmi, David
Bruck, Irina
Kuriyan, John

<120> ENZYMES DERIVED FROM THERMOPHILIC ORGANISMS THAT
FUNCTION AS A CHROMOSOMAL REPLICASE, PREPARATION AND
USE THEREOF

<130> 22221/1030

<140>

<141>

<150> 60/143,202

<151> 1997-04-08

<150> 08/823,407

<151> 1997-04-08

<150> 09/057,416

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<160> 212

<170> PatentIn Ver. 2.1

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<212> DNA

<213> Thermus thermophilus

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 Val Gly Gln Glu His Val Lys Glu Pro Leu Leu Lys Ala Ile Arg Glu
 20 25 30
 Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly
 35 40 45
 Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly
 50 55 60
 Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg
 65 70 75 80
 Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser
 85 90 95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
 100 105 110
 Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
 115 120 125
 Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
 130 135 140
 His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
 145 150 155 160
 Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
 165 170 175
 Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg
 180 185 190
 Glu Ala Glu Glu Glu Ala Leu Leu Leu Leu Ala Arg Leu Ala Asp Gly
 195 200 205
 Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu
 210 215 220
 Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro
 225 230 235 240
 Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr
 245 250 255
 Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala
 260 265 270
 Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu
 275 280 285
 Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln
 290 295 300
 Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu
 305 310 315 320
 Ala Arg Arg Ser Asp Ala Leu Ser Leu Glu Val Ala Leu Leu Glu Ala
 325 330 335
 Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro
 340 345 350

Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro
355 360 365

Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe
370 375 380

Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg
385 390 395 400

Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys
405 410 415

Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro
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Leu Ala Gln Ala His Phe Gly Val Glu Glu Val Val Leu Val Leu Glu
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Gly Glu Lys Lys Ser Leu Ser Pro Arg Pro Arg Pro Ala Pro Pro Pro
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Glu Ala Ala Glu Glu Ala Pro Glu Glu Ala Leu Arg Arg Val Val Arg
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<210> 3

<211> 1590

<212> DNA

<213> Thermus thermophilus

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 <212> PRT
 <213> *Thermus thermophilus*

<400> 4
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 20 25 30
 Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly
 35 40 45
 Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly
 50 55 60
 Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg
 65 70 75 80
 Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser
 85 90 95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
 100 105 110
 Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
 115 120 125
 Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
 130 135 140
 His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
 145 150 155 160
 Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
 165 170 175
 Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg
 180 185 190
 Glu Ala Glu Glu Glu Ala Leu Leu Leu Leu Ala Arg Leu Ala Asp Gly
 195 200 205
 Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu
 210 215 220
 Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro
 225 230 235 240
 Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr
 245 250 255
 Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala
 260 265 270
 Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu
 275 280 285
 Tyr Ala Ala Phe Gly Leu Ala Gly Thr Pro Leu Pro Ala Pro Pro Gln
 290 295 300
 Ala Leu Ile Ala Ala Met Thr Ala Leu Asp Glu Ala Met Glu Arg Leu
 305 310 315 320
 Ala Arg Arg Ser Asp Ala Leu Ser Leu Glu Val Ala Leu Leu Glu Ala
 325 330 335
 Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro
 340 345 350

Ser Pro Glu Val Gly Pro Lys Pro Glu Ser Pro Pro Thr Pro Glu Pro
355 360 365

Pro Arg Pro Glu Glu Ala Pro Asp Leu Arg Glu Arg Trp Arg Ala Phe
370 375 380

Leu Glu Ala Leu Arg Pro Thr Leu Arg Ala Phe Val Arg Glu Ala Arg
385 390 395 400

Pro Glu Val Arg Glu Gly Gln Leu Cys Leu Ala Phe Pro Glu Asp Lys
405 410 415

Ala Phe His Tyr Arg Lys Ala Ser Glu Gln Lys Val Arg Leu Leu Pro
420 425 430

Leu Ala Gln Ala His Phe Gly Val Glu Glu Val Val Leu Val Leu Glu
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Gly Glu Lys Lys Lys Pro Glu Pro Lys Ala Pro Pro Gly Pro Thr Ser
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<210> 5

<211> 454

<212> PRT

<213> *Thermus thermophilus*

<400> 5

Met Ser Ala Leu Tyr Arg Arg Phe Arg Pro Leu Thr Phe Gln Glu Val
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Val Gly Gln Glu His Val Lys Glu Pro Leu Leu Lys Ala Ile Arg Glu
20 25 30

Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly
35 40 45

Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly
50 55 60

Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg
65 70 75 80

Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser

95

Gly Arg Ala Leu Ala Ala Glu Ala Leu Pro Gln Pro Thr Gly Ala Pro

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<213> Artificial Sequence
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 <220>
 <223> Description of Artificial Sequence: primer

 <400> 8
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<210> 9
 <211> 9
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: peptide

 <400> 9
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<210> 10
 <211> 38
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 10
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38

<210> 11
 <211> 38
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 11
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38

<210> 12
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 12
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<210> 13
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 13
gcgcgaattc gcgcttcggg aggtggg 27

<210> 14
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 14
gcgcgaattc gggcgcttca ggaggtggg 29

<210> 15
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 15
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<210> 16
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 16
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<210> 17
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

<400> 17
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<210> 18
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: peptide

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<210> 19
<211> 180
<212> PRT
<213> Escherichia coli

<400> 19
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Asp Val Val Gly Gln Glu His Val Leu Thr Ala Leu Ala Asn Gly Leu
 20 25 30
 Ser Leu Gly Arg Ile His His Ala Tyr Leu Phe Ser Gly Thr Arg Gly
 35 40 45
 Val Gly Lys Thr Ser Ile Ala Arg Leu Leu Ala Lys Gly Leu Asn Cys
 50 55 60
 Glu Thr Gly Ile Thr Ala Thr Pro Cys Gly Val Cys Asp Asn Cys Arg
 65 70 75 80
 Glu Ile Glu Gln Gly Arg Phe Val Asp Leu Ile Glu Ile Asp Ala Ala
 85 90 95
 Ser Arg Thr Lys Val Glu Asp Thr Arg Asp Leu Leu Asp Asn Val Gln
 100 105 110
 Tyr Ala Pro Ala Arg Gly Arg Phe Lys Val Tyr Leu Ile Asp Glu Val
 115 120 125
 His Met Leu Ser Arg His Ser Phe Asn Ala Leu Leu Lys Thr Leu Glu
 130 135 140
 Glu Pro Pro Glu His Val Lys Phe Leu Leu Ala Thr Thr Asp Pro Gln
 145 150 155 160
 Lys Leu Pro Val Thr Ile Leu Ser Arg Cys Leu Gln Phe His Leu Lys
 165 170 175
 Ala Leu Asp Val
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<210> 20

<211> 180

<212> PRT

<213> Bacillus subtilis

<400> 20

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 20 25 30

Leu Gln Lys Lys Phe Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly

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35 40 45
Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys
50 55 60
Glu His Ala Pro Val Asp Glu Pro Cys Asn Glu Cys Ala Ala Cys Lys
65 70 75 80
Gly Ile Thr Asn Gly Ser Ile Ser Asp Val Ile Glu Ile Asp Ala Ala
85 90 95
Ser Asn Asn Gly Val Asp Glu Ile Arg Asp Ile Arg Asp Lys Val Lys
100 105 110
Phe Ala Pro Ser Ala Val Thr Tyr Lys Val Tyr Ile Ile Asp Glu Val
115 120 125
His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140
Glu Pro Pro Glu His Cys Ile Phe Ile Leu Ala Thr Thr Glu Pro His
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Lys Ile Pro Leu Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Lys
165 170 175
Arg Ile Thr Ser
180

<210> 21
<211> 294
<212> PRT
<213> Escherichia coli

<400> 21
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Asp Val Val Gly Gln Glu His Val Leu Thr Ala Leu Ala Asn Gly Leu
20 25 30
Ser Leu Gly Arg Ile His His Ala Tyr Leu Phe Ser Gly Thr Arg Gly
35 40 45
Val Gly Lys Thr Ser Ile Ala Arg Leu Leu Ala Lys Gly Leu Asn Cys
50 55 60

Glu Thr Gly Ile Thr Ala Thr Pro Cys Gly Val Cys Asp Asn Cys Arg
 65 70 75 80
 Glu Ile Glu Gln Gly Arg Phe Val Asp Leu Ile Glu Ile Asp Ala Ala
 85 90 95
 Ser Arg Thr Lys Val Glu Asp Thr Arg Asp Leu Leu Asp Asn Val Gln
 100 105 110
 Tyr Ala Pro Ala Arg Gly Arg Phe Lys Val Tyr Leu Ile Asp Glu Val
 115 120 125
 His Met Leu Ser Arg His Ser Phe Asn Ala Leu Leu Lys Thr Leu Glu
 130 135 140
 Glu Pro Pro Glu His Val Lys Phe Leu Leu Ala Thr Thr Asp Pro Gln
 145 150 155 160
 Lys Leu Pro Val Thr Ile Leu Ser Arg Cys Leu Gln Phe His Leu Lys
 165 170 175
 Ala Leu Asp Val Glu Gln Ile Arg His Gln Leu Glu His Ile Leu Asn
 180 185 190
 Glu Glu His Ile Ala His Glu Pro Arg Ala Leu Gln Leu Leu Ala Arg
 195 200 205
 Ala Ala Glu Gly Ser Leu Arg Asp Ala Leu Ser Leu Thr Asp Gln Ala
 210 215 220
 Ile Ala Ser Gly Asp Gly Gln Val Ser Thr Gln Ala Val Ser Ala Met
 225 230 235 240
 Leu Gly Thr Leu Asp Asp Asp Gln Ala Leu Ser Leu Val Glu Ala Met
 245 250 255
 Val Glu Ala Asn Gly Glu Arg Val Met Ala Leu Ile Asn Glu Ala Ala
 260 265 270
 Ala Arg Gly Ile Glu Trp Glu Ala Leu Leu Val Glu Met Leu Gly Leu
 275 280 285
 Leu His Arg Ile Ala Met
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<210> 22

<211> 294

<212> PRT

<213> Haemophilus influenzae

<400> 22

Met Ser Tyr Gln Val Leu Ala Arg Lys Trp Arg Pro Lys Thr Phe Ala
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Asp Val Val Gly Gln Glu His Ile Ile Thr Ala Leu Ala Asn Gly Leu
20 25 30

Lys Asp Asn Arg Leu His His Ala Tyr Leu Phe Ser Gly Thr Arg Gly
35 40 45

Val Gly Lys Thr Ser Ile Ala Arg Leu Phe Ala Lys Gly Leu Asn Cys
50 55 60

Val His Gly Val Thr Ala Thr Pro Cys Gly Glu Cys Glu Asn Cys Lys
65 70 75 80

Ala Ile Glu Gln Gly Asn Phe Ile Asp Leu Ile Glu Ile Asp Ala Ala
85 90 95

Ser Arg Thr Lys Val Glu Asp Thr Arg Glu Leu Leu Asp Asn Val Gln
100 105 110

Tyr Lys Pro Val Val Gly Arg Phe Lys Val Tyr Leu Ile Asp Glu Val
115 120 125

His Met Leu Ser Arg His Ser Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Glu Tyr Val Lys Phe Leu Leu Ala Thr Thr Asp Pro Gln
145 150 155 160

Lys Leu Pro Val Thr Ile Leu Ser Arg Cys Leu Gln Phe His Leu Lys
165 170 175

Ala Leu Asp Glu Thr Gln Ile Ser Gln His Leu Ala His Ile Leu Thr
180 185 190

Gln Glu Asn Ile Pro Phe Glu Asp Pro Ala Leu Val Lys Leu Ala Lys
195 200 205

Ala Ala Gln Gly Ser Ile Arg Asp Ser Leu Ser Leu Thr Asp Gln Ala
210 215 220

Ile Ala Met Gly Asp Arg Gln Val Thr Asn Asn Val Val Ser Asn Met
225 230 235 240

Leu Gly Leu Leu Asp Asp Asn Tyr Ser Val Asp Ile Leu Tyr Ala Leu
245 250 255

His Gln Gly Asn Gly Glu Leu Leu Met Arg Thr Leu Gln Arg Val Ala
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Asp Ala Ala Gly Asp Trp Asp Lys Leu Leu Gly Glu Cys Ala Glu Lys
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Leu His Gln Ile Ala Leu
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<210> 23

<211> 294

<212> PRT

<213> Bacillus subtilis

<400> 23

Met Ser Tyr Gln Ala Leu Tyr Arg Val Phe Arg Pro Gln Arg Phe Glu
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Asp Val Val Gly Gln Glu His Ile Thr Lys Thr Leu Gln Asn Ala Leu
20 25 30

Leu Gln Lys Lys Phe Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly
35 40 45

Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys
50 55 60

Glu His Ala Pro Val Asp Glu Pro Cys Asn Glu Cys Ala Ala Cys Lys
65 70 75 80

Gly Ile Thr Asn Gly Ser Ile Ser Asp Val Ile Glu Ile Asp Ala Ala
85 90 95

Ser Asn Asn Gly Val Asp Glu Ile Arg Asp Ile Arg Asp Lys Val Lys
100 105 110

Phe Ala Pro Ser Ala Val Thr Tyr Lys Val Tyr Ile Ile Asp Glu Val
115 120 125

His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Glu His Cys Ile Phe Ile Leu Ala Thr Thr Glu Pro His

145 150 155 160
 Lys Ile Pro Leu Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Lys
 165 170 175
 Arg Ile Thr Ser Gln Ala Ile Val Gly Arg Met Asn Lys Ile Val Asp
 180 185 190
 Ala Glu Gln Leu Gln Val Glu Glu Gly Ser Leu Glu Ile Ile Ala Ser
 195 200 205
 Ala Ala His Gly Gly Met Arg Asp Ala Leu Ser Leu Leu Asp Gln Ala
 210 215 220
 Ile Ser Phe Ser Gly Asp Ile Leu Lys Val Glu Asp Ala Leu Leu Ile
 225 230 235 240
 Thr Gly Ala Val Ser Gln Leu Tyr Ile Gly Lys Leu Ala Lys Ser Leu
 245 250 255
 His Asp Lys Asn Val Ser Asp Ala Leu Glu Thr Leu Asn Glu Leu Leu
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 Phe Arg Asp Met Leu Leu
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<210> 24
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 <213> *Caulobacter crescentus*

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 Ser Thr Gly Arg Ile Ala His Ala Phe Met Leu Thr Gly Val Arg Gly
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 Val Gly Lys Thr Thr Thr Ala Arg Leu Leu Ala Arg Ala Leu Asn Tyr
 50 55 60

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Tyr	His	Cys	Arg	Ser	Ile	Ile	Glu	Gly	Arg	His	Met	Asp	Val	Leu	Glu	85	90	95	
Leu	Asp	Ala	Ala	Ser	Arg	Thr	Lys	Val	Asp	Glu	Met	Arg	Glu	Leu	Leu	100	105	110	
Asp	Gly	Val	Arg	Tyr	Ala	Pro	Val	Glu	Ala	Arg	Tyr	Lys	Val	Tyr	Ile	115	120	125	
Ile	Asp	Glu	Val	His	Met	Leu	Ser	Thr	Ala	Ala	Phe	Asn	Ala	Leu	Leu	130	135	140	
Lys	Thr	Leu	Glu	Glu	Pro	Pro	Pro	His	Ala	Lys	Phe	Ile	Phe	Ala	Thr	145	150	155	160
Thr	Glu	Ile	Arg	Lys	Val	Pro	Val	Thr	Ile	Leu	Ser	Arg	Cys	Gln	Arg	165	170	175	
Phe	Asp	Leu	Arg	Arg	Val	Glu	Pro	Asp	Val	Leu	Val	Lys	His	Phe	Asp	180	185	190	
Arg	Ile	Ser	Ala	Lys	Glu	Gly	Ala	Arg	Ile	Glu	Met	Asp	Ala	Leu	Ala	195	200	205	
Leu	Ile	Ala	Arg	Ala	Ala	Glu	Gly	Ser	Val	Arg	Asp	Gly	Leu	Ser	Leu	210	215	220	
Leu	Asp	Gln	Ala	Ile	Val	Gln	Thr	Glu	Arg	Gly	Gln	Thr	Val	Thr	Ser	225	230	235	240
Thr	Val	Val	Arg	Asp	Met	Leu	Gly	Leu	Ala	Asp	Arg	Ser	Gln	Thr	Ile	245	250	255	
Ala	Leu	Tyr	Glu	His	Val	Met	Ala	Gly	Lys	Thr	Lys	Asp	Ala	Leu	Glu	260	265	270	
Gly	Phe	Arg	Ala	Leu	Trp	Gly	Phe	Gly	Ala	Asp	Pro	Ala	Val	Val	Met	275	280	285	
Leu	Asp	Val	Leu	Asp	His	Cys	His	Ala	Ser	Ala	Val	290	295	300					

<210> 25

<211> 260

<212> PRT

<213> Mycoplasma genitalium

<400> 25

Met His Gln Val Phe Tyr Gln Lys Tyr Arg Pro Ile Asn Phe Lys Gln
1 5 10 15

Thr Leu Gly Gln Glu Ser Ile Arg Lys Ile Leu Val Asn Ala Ile Asn
20 25 30

Arg Asp Lys Leu Pro Asn Gly Tyr Ile Phe Ser Gly Glu Arg Gly Thr
35 40 45

Gly Lys Thr Thr Phe Ala Lys Ile Ile Ala Lys Ala Ile Asn Cys Leu
50 55 60

Asn Trp Asp Gln Ile Asp Val Cys Asn Ser Cys Asp Val Cys Lys Ser
65 70 75 80

Ile Asn Thr Asn Ser Ala Ile Asp Ile Val Glu Ile Asp Ala Ala Ser
85 90 95

Lys Asn Gly Ile Asn Asp Ile Arg Glu Leu Val Glu Asn Val Phe Asn
100 105 110

His Pro Phe Thr Phe Lys Lys Lys Val Tyr Ile Leu Asp Glu Ala His
115 120 125

Met Leu Thr Thr Gln Ser Trp Gly Gly Leu Leu Lys Thr Leu Glu Glu
130 135 140

Ser Pro Pro Tyr Val Leu Phe Ile Phe Thr Thr Thr Glu Phe Asn Lys
145 150 155 160

Ile Pro Leu Thr Ile Leu Ser Arg Cys Gln Ser Phe Phe Phe Lys Lys
165 170 175

Ile Thr Ser Asp Leu Ile Leu Glu Arg Leu Asn Asp Ile Ala Lys Lys
180 185 190

Glu Lys Ile Lys Ile Glu Lys Asp Ala Leu Ile Lys Ile Ala Asp Leu
195 200 205

Ser Gln Gly Ser Leu Arg Asp Gly Leu Ser Leu Leu Asp Gln Leu Ala
210 215 220

Ile Ser Leu Ile Val Lys Lys Leu Val Leu Leu Met Leu Lys Lys His
225 230 235 240

Leu Ile Ser Leu Ile Glu Met Gln Asn Leu Leu Leu Leu Lys Gln Phe
245 250 255

Tyr Gln Glu Ile
260

<210> 26

<211> 289

<212> PRT

<213> Thermus thermophilus

<400> 26

Val Ser Ala Leu Tyr Arg Arg Phe Arg Pro Leu Thr Phe Gln Glu Val
1 5 10 15

Val Gly Gln Glu His Val Lys Glu Pro Leu Leu Lys Ala Ile Arg Glu
20 25 30

Gly Arg Leu Ala Gln Ala Tyr Leu Phe Ser Gly Pro Arg Gly Val Gly
35 40 45

Lys Thr Thr Thr Ala Arg Leu Leu Ala Met Ala Val Gly Cys Gln Gly
50 55 60

Glu Asp Pro Pro Cys Gly Val Cys Pro His Cys Gln Ala Val Gln Arg
65 70 75 80

Gly Ala His Pro Asp Val Val Asp Ile Asp Ala Ala Ser Asn Asn Ser
85 90 95

Val Glu Asp Val Arg Glu Leu Arg Glu Arg Ile His Leu Ala Pro Leu
100 105 110

Ser Ala Pro Arg Lys Val Phe Ile Leu Asp Glu Ala His Met Leu Ser
115 120 125

Lys Ser Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro Pro Pro
130 135 140

His Val Leu Phe Val Phe Ala Thr Thr Glu Pro Glu Arg Met Pro Pro
145 150 155 160

Thr Ile Leu Ser Arg Thr Gln His Phe Arg Phe Arg Arg Leu Thr Glu
165 170 175

Glu Glu Ile Ala Phe Lys Leu Arg Arg Ile Leu Glu Ala Val Gly Arg

	180		185		190
Glu Ala Glu Glu Glu Ala Leu Leu Leu Leu Ala Arg Leu Ala Asp Gly					
195		200		205	
Ala Leu Arg Asp Ala Glu Ser Leu Leu Glu Arg Phe Leu Leu Leu Glu					
210		215		220	
Gly Pro Leu Thr Arg Lys Glu Val Glu Arg Ala Leu Gly Ser Pro Pro					
225		230		235	240
Gly Thr Gly Val Ala Glu Ile Ala Ala Ser Leu Ala Arg Gly Lys Thr					
	245		250		255
Ala Glu Ala Leu Gly Leu Ala Arg Arg Leu Tyr Gly Glu Gly Tyr Ala					
	260		265		270
Pro Arg Ser Leu Val Ser Gly Leu Leu Glu Val Phe Arg Glu Gly Leu					
	275		280		285

Tyr

<210> 27
 <211> 94
 <212> DNA
 <213> Thermus thermophilus

<400> 27
 gccggaggga gaaaaaaaaa gccgagccca aggccccgcc cggccccacc ccgaagcgcc 60
 cgcacccccg ggccccccga ggaggaggag aggc 94

<210> 28
 <211> 11
 <212> PRT
 <213> Thermus thermophilus

<400> 28
 Val Leu Glu Gly Glu Lys Lys Ser Leu Ser Pro
 1 5 10

<210> 29
 <211> 23
 <212> DNA
 <213> Artificial Sequence

09716964-112100

<220>

<223> Description of Artificial Sequence: primer

<400> 29

cacgcntacc tnttctccgg nac

23

<210> 30

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 30

gtgctcnggn ggctcctcnt cngtc

25

<210> 31

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 31

gtgggatccg tggttctgga tctcgatgaa gaa

33

<210> 32

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 32

gtgggatcca cggststcs gagcagaag

29

<210> 33

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 33

gcgggatacct caacgaggac ctctccatct tcaa

34

<210> 34

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 34

gcgggatacct tgcgtcsag sgtsagsgcg tcgta

35

<210> 35

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 35

gggaaggacc agcgcgtact cccctgctc ctaggtgtg

39

<210> 36

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 36

gtgtggatcc ttcttcttsc ccatsgc

27

<210> 37

<211> 27

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: primer

 <400> 37
 caccgattcc agtggtgcct aggtgtg 27

 <210> 38
 <211> 30
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 38
 caacacctgg tgttccagga gcctgtgctt 30

 <210> 39
 <211> 23
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 39
 ccagaatcgt ctgctggctg tag 23

 <210> 40
 <211> 19
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 40
 agcaccctgg aggagcttc 19

 <210> 41
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 41

catgtcgtac tgggtgtac

19

<210> 42

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<220>

<221> unsure

<222> (7)

<223> N at any position in this sequence is A, C, G, or
T

<400> 42

gtsgtstnng acnnsagac sacsggg

27

<210> 43

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<220>

<221> unsure

<222> (8)

<223> N at any position in this sequence is A, C, G, or
T

<400> 43

gaasccsnng tcgaasnng cgttgtg

27

<210> 44

<211> 27

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: primer

 <400> 44
 cggggatcca cctcaatcac ctctgtgg 27

 <210> 45
 <211> 30
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 45
 cggggatccg ccaccttgcg gctccgggtg 30

 <210> 46
 <211> 31
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 46
 gcgctctaga cgagttcca aagcgtgcgg t 31

 <210> 47
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: primer

 <400> 47
 cgcgctctaga tcacctgtat ccaga 25

 <210> 48
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 48
gcggcgcata tgggtggtggt cctggacctg gag 33

<210> 49
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 49
cgcggtctaga tcacctgtat ccaga 25

<210> 50
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 50
gtsctsgtsa agacscactt 20

<210> 51
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 51
sagsagsgcg ttgaasgtgt g 21

<210> 52
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 52
ctcgttggtg aaagtttccg tg 22

<210> 53
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 53
ctcgttggtg aaagtttccg tg 22

<210> 54
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 54
tctggcaaca cgttctggag cacatcc 27

<210> 55
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 55
tgctggcggt catcttcagg atg 23

<210> 56
<211> 23
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 56

catcctgaag atgaacgcca gca

23

<210> 57

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 57

aggttatcca caggggtcat gtgca

25

<210> 58

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 58

gtgtgtcata tgaacataac gggtcccaa

29

<210> 59

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 59

gcgcgaattc tcccttgtag aaggcttag

29

<210> 60

<211> 13

<212> PRT

<213> Thermus thermophilus

<400> 60

Arg Val Glu Leu Asp Tyr Asp Ala Leu Thr Leu Asp Asp

1 5 10

<210> 61

<211> 14

<212> PRT

<213> *Thermus thermophilus*

<400> 61

Phe Phe Ile Glu Ile Gln Asn His Gly Leu Ser Glu Gln Lys

1 5 10

<210> 62

<211> 8

<212> PRT

<213> *Thermus thermophilus*

<400> 62

Phe Phe Ile Glu Ile Gln Asn His

1 5

<210> 63

<211> 8

<212> PRT

<213> *Thermus thermophilus*

<400> 63

Tyr Asp Ala Leu Thr Leu Asp Asp

1 5

<210> 64

<211> 6

<212> PRT

<213> *Thermus thermophilus*

<400> 64

Ala Met Gly Lys Lys Lys

1 5

<210> 65

<211> 9

<212> PRT

<213> Thermus thermophilus

<400> 65

Phe Asn Lys Ser His Ser Ala Ala Tyr

1

5

<210> 66

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide

<400> 66

Val Val Xaa Asp Xaa Glu Thr Thr Gly

1

5

<210> 67

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide

<400> 67

His Asn Ala Xaa Phe Asp Xaa Gly Phe

1

5

<210> 68

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: peptide

<400> 68

Val Val Xaa Asp Xaa Glu Thr Thr Gly

1

5

<210> 69

<211> 7
 <212> PRT
 <213> *Thermus thermophilus*

<400> 69
 Val Leu Val Lys Thr His Leu
 1 5

<210> 70
 <211> 6
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: peptide

<400> 70
 His Arg Ala Leu Tyr Asp
 1 5

<210> 71
 <211> 7
 <212> PRT
 <213> *Thermus thermophilus*

<400> 71
 His Thr Phe Asn Ala Leu Leu
 1 5

<210> 72
 <211> 34
 <212> PRT
 <213> *Escherichia coli*

<400> 72
 Asp Arg Tyr Phe Leu Glu Leu Ile Arg Thr Gly Arg Pro Asp Glu Glu
 1 5 10 15

Ser Tyr Leu His Ala Ala Val Glu Leu Ala Glu Ala Arg Gly Leu Pro
 20 25 30

Val Val

<210> 73
 <211> 34
 <212> PRT
 <213> *Vibrio cholerae*

<400> 73
 Asp His Phe Tyr Leu Glu Leu Ile Arg Thr Gly Arg Ala Asp Glu Glu
 1 5 10 15
 Ser Tyr Leu His Phe Ala Leu Asp Val Ala Glu Gln Tyr Asp Leu Pro
 20 25 30
 Val Val

<210> 74
 <211> 34
 <212> PRT
 <213> *Haemophilus influenzae*

<400> 74
 Asp His Phe Tyr Leu Ala Leu Ser Arg Thr Gly Arg Pro Asn Glu Glu
 1 5 10 15
 Arg Tyr Ile Gln Ala Ala Leu Lys Leu Ala Glu Arg Cys Asp Leu Pro
 20 25 30
 Leu Val

<210> 75
 <211> 34
 <212> PRT
 <213> *Rickettsia prowazekii*

<400> 75
 Asp Arg Phe Tyr Phe Glu Ile Met Arg His Asp Leu Pro Glu Glu Gln
 1 5 10 15
 Phe Ile Glu Asn Ser Tyr Ile Gln Ile Ala Ser Glu Leu Ser Ile Pro
 20 25 30
 Ile Val

<210> 76
 <211> 34
 <212> PRT
 <213> *Helicobacter pylori*

<400> 76
 Asp Asp Phe Tyr Leu Glu Ile Met Arg His Gly Ile Leu Asp Gln Arg
 1 5 10 15
 Phe Ile Asp Glu Gln Val Ile Lys Met Ser Leu Glu Thr Gly Leu Lys
 20 25 30
 Ile Ile

<210> 77
 <211> 34
 <212> PRT
 <213> *Synechocystis* sp.

<400> 77
 Asp Asp Tyr Tyr Leu Glu Ile Gln Asp His Gly Ser Val Glu Asp Arg
 1 5 10 15
 Leu Val Asn Ile Asn Leu Val Lys Ile Ala Gln Glu Leu Asp Ile Lys
 20 25 30
 Ile Val

<210> 78
 <211> 34
 <212> PRT
 <213> *Mycobacterium tuberculosis*

<400> 78
 Asp Asn Tyr Phe Leu Glu Leu Met Asp His Gly Leu Thr Ile Glu Arg
 1 5 10 15
 Arg Val Arg Asp Gly Leu Leu Glu Ile Gly Arg Ala Leu Asn Ile Pro
 20 25 30
 Pro Leu

<210> 79
 <211> 46
 <212> PRT
 <213> Escherichia coli

<400> 79
 Asn Lys Arg Arg Ala Lys Asn Gly Glu Pro Pro Leu Asp Ile Ala Ala
 1 5 10 15
 Ile Pro Leu Asp Asp Lys Lys Ser Phe Asp Met Leu Gln Arg Ser Glu
 20 25 30
 Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Asp
 35 40 45

<210> 80
 <211> 46
 <212> PRT
 <213> Vibrio cholerae

<400> 80
 Asn Pro Arg Leu Lys Lys Ala Gly Lys Pro Pro Val Arg Ile Glu Ala
 1 5 10 15
 Ile Pro Leu Asp Asp Ala Arg Ser Phe Arg Asn Leu Gln Asp Ala Lys
 20 25 30
 Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Glu
 35 40 45

<210> 81
 <211> 46
 <212> PRT
 <213> Haemophilus influenzae

<400> 81
 Asn Val Arg Met Val Arg Glu Gly Lys Pro Arg Val Asp Ile Ala Ala
 1 5 10 15
 Ile Pro Leu Asp Asp Pro Glu Ser Phe Glu Leu Leu Lys Arg Ser Glu
 20 25 30
 Thr Thr Ala Val Phe Gln Leu Glu Ser Arg Gly Met Lys Asp
 35 40 45

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<210> 82
 <211> 46
 <212> PRT
 <213> Rickettsia prowazekii

<400> 82
 Cys Lys Lys Leu Leu Lys Glu Gln Gly Ile Lys Ile Asp Phe Asp Asp
 1 5 10 15
 Met Thr Phe Asp Asp Lys Lys Thr Tyr Gln Met Leu Cys Lys Gly Lys
 20 25 30
 Gly Val Gly Val Phe Gln Phe Glu Ser Ile Gly Met Lys Asp
 35 40 45

<210> 83
 <211> 45
 <212> PRT
 <213> Helicobacter pylori

<400> 83
 Leu Lys Ile Ile Lys Thr Gln His Lys Ile Ser Val Asp Phe Leu Ser
 1 5 10 15
 Leu Asp Met Asp Asp Pro Lys Val Tyr Lys Thr Ile Gln Ser Gly Asp
 20 25 30
 Thr Val Gly Ile Phe Gln Ile Glu Ser Gly Met Phe Gln
 35 40 45

<210> 84
 <211> 46
 <212> PRT
 <213> Synechocystis sp.

<400> 84
 Gln Glu Arg Lys Ala Leu Gln Ile Arg Ala Arg Thr Gly Ser Lys Lys
 1 5 10 15
 Leu Pro Asp Asp Val Lys Lys Thr His Lys Leu Leu Glu Ala Gly Asp
 20 25 30
 Leu Glu Gly Ile Phe Gln Leu Glu Ser Gln Gly Met Lys Gln
 35 40 45

<210> 85
 <211> 46
 <212> PRT
 <213> Mycobacterium tuberculosis

<400> 85
 Ile Asp Asn Val Arg Ala Asn Arg Gly Ile Asp Leu Asp Leu Glu Ser
 1 5 10 15
 Val Pro Leu Asp Asp Lys Ala Thr Tyr Glu Leu Leu Gly Arg Gly Asp
 20 25 30
 Thr Leu Gly Val Phe Gln Leu Asp Gly Gly Pro Met Arg Asp
 35 40 45

<210> 86
 <211> 3729
 <212> DNA
 <213> Thermus thermophilus

<400> 86
 atgggcccggg agctccgctt cgcccacctc caccagcaca cccagttctc cctcctggac 60
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 gccttgggcca tgaccgacca cggcaacctc ttccggggccg tggagttcta caagaaggcc 180
 accgaaatgg gcatcaagcc catcctgggc tacgaggcct acgtggcggc ggaaagccgc 240
 tttgaccgca agcggggaaa gggcctagac gggggctact ttcacctcac cctcctcgcc 300
 aaggacttca cgggggtacca gaacctggtg cgcctggcga gccgggctta cctggagggg 360
 ttttacgaaa agccccggat tgaccgggag atcctgcgcg agcacgccga gggcctcatc 420
 gccctctcgg ggtgcctcgg ggcggagatc cccagttca tcctccagga ccgtctggac 480
 ctggccgagg cccggctcaa cgagtacctc tccatcttca aggaccgctt cttcatcgag 540
 atccagaacc acggcctccc cgagcagaaa aaggtcaacg aggtcctcaa ggagttcgcc 600
 cgaaagtacg gcctggggat ggtggccacc aacgacggcc attacgtgag gaaggaggac 660
 gcccgcgccc acgaggtcct cctcgccatc cagtccaaga gcaccctgga cgaccccggg 720
 cgctggcgct tcccctgcga cgagttctac gtgaagaccc ccgaggagat gcggggccatg 780
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 cccgagggggc ggaccgaggc ccagtacctc atggagctca cttcaaggg gctcctccgc 960
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 gcttgggaga ggctcatgaa gagcctcccc cttttggccg ggggtcaagga gtggacggcg 1140
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 ggctacttcc tcatcgtcca ggactacatc aactggggccc ggagaaacgg cgtctccgtg 1260
 gggcccggca gggggagcgc cgccgggagc ctggtggcct acgccgtggg gatcaccaac 1320
 attgaccccc tccgcttcgg cctcctcttt gacgccttcc tgaaccggga gagggtctcc 1380
 atgcccgaca ttgacacgga cttctccgac cgggagcggg accgggtgat ccagtacgtg 1440
 cgggagcgct acggcgagga caaggtggcc cagatcgcca ccctgggaag cctcgccctc 1500
 aaggccgccc tcaaggacgt ggcccgggtc tacggcatcc cccacaagaa ggccggaggaa 1560

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ttggccaagc tcatcccggg gcagttcggg aagcccaagc ccctgcagga ggccatccag 1620
gtggtgccgg agcttagggc ggagatggag aaggacccca aggtgcggga ggtcctcgag 1680
gtggccatgc gcctggaggg cctgaaccgc cagcctccg tccacgccgc cggggtgggtg 1740
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gaggcggaac tctcgcggcg gtccatgggc aagaagaagg tggaggagat gaagtccac 2340
cgggagcgct tcgtccaggg ggccaaggaa aggggcgtgc ccgaggagga ggccaaccgc 2400
ctctttgaca tgctggaggc cttcgccaac tacggcttca acaaatccca cgctgccgc 2460
tacagcctcc tctcctacca gaccgcctac gtgaaggccc actaccctgt ggagtctcatg 2520
gccgccctcc tctcctgga ggcgcacgac tccgacaagg tggccgagta catccgcgac 2580
gcccggggcca tgggcataga ggtccttccc ccggacgtca accgctccgg gtttgacttc 2640
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gaagtggagg agccgccttt ggccgaggcc gcccccttg acgagatcac ccggtccgc 3000
tacgagaagg aggccttggt gatctacgtc tccggccacc ccatcttgcg gtaccccg 3060
ctccgggaga cggccacctg caccctggag gagcttcccc acctggcccc ggacctgccg 3120
ccccggtcta ggtcctcct tgccgggatg gtggaggagg tgggtgcgaa gccacaaaag 3180
agcggcgga tgatggcccc ctctcctc tccgacgaga cgggggcgct tgaggcggtg 3240
gcattcggcc gggcctacga ccaggtctcc ccgaggctca aggaggacac ccccgctc 3300
gtcctcggc aggtggagcg ggaggagggg ggcgtgcggg tgctggccca ggccgtttg 3360
acctacgagg agctggagca ggtcccccg gccctcagg tggagggtga ggccctcctc 3420
ctggacgacc ggggggtggc ccacctgaaa agcctcctg acgagcacgc ggggacctc 3480
cccctgtacg tccgggtcca gggcgccctt ggcgaggccc tctcgcctt gaggaggtg 3540
cgggtggggg aggagctgt aggcggccgc gtggttccgg gcctacctc tgcccgaccg 3600
ggaggtcctt ctccagggcg gccaggcggg ggaggcccag gaggcggtgc cttctaggg 3660
ggtgggccgt gagacctag gccatcgctc tcgccggggg caaggaggcc tgggcccag 3720
cccttttg 3729

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<210> 87

<211> 1245

<212> PRT

<213> *Thermus thermophilus*

<400> 87

Met Gly Arg Glu Leu Arg Phe Ala His Leu His Gln His Thr Gln Phe

1

5

10

15

Ser Leu Leu Asp Gly Ala Pro Lys Leu Ser Asp Leu Leu Lys Trp Val
 20 25 30
 Glu Glu Thr Thr Pro Glu Asp Pro Ala Leu Ala Met Thr Asp His Gly
 35 40 45
 Asn Leu Phe Gly Ala Val Glu Phe Tyr Lys Lys Ala Thr Glu Met Gly
 50 55 60
 Ile Lys Pro Ile Leu Gly Tyr Glu Ala Tyr Val Ala Ala Glu Ser Arg
 65 70 75 80
 Phe Asp Arg Lys Arg Gly Lys Gly Leu Asp Gly Gly Tyr Phe His Leu
 85 90 95
 Thr Leu Leu Ala Lys Asp Phe Thr Gly Tyr Gln Asn Leu Val Arg Leu
 100 105 110
 Ala Ser Arg Ala Tyr Leu Glu Gly Phe Tyr Glu Lys Pro Arg Ile Asp
 115 120 125
 Arg Glu Ile Leu Arg Glu His Ala Glu Gly Leu Ile Ala Leu Ser Gly
 130 135 140
 Cys Leu Gly Ala Glu Ile Pro Gln Phe Ile Leu Gln Asp Arg Leu Asp
 145 150 155 160
 Leu Ala Glu Ala Arg Leu Asn Glu Tyr Leu Ser Ile Phe Lys Asp Arg
 165 170 175
 Phe Phe Ile Glu Ile Gln Asn His Gly Leu Pro Glu Gln Lys Lys Val
 180 185 190
 Asn Glu Val Leu Lys Glu Phe Ala Arg Lys Tyr Gly Leu Gly Met Val
 195 200 205
 Ala Thr Asn Asp Gly His Tyr Val Arg Lys Glu Asp Ala Arg Ala His
 210 215 220
 Glu Val Leu Leu Ala Ile Gln Ser Lys Ser Thr Leu Asp Asp Pro Gly
 225 230 235 240
 Ala Leu Ala Leu Pro Cys Glu Glu Phe Tyr Val Lys Thr Pro Glu Glu
 245 250 255
 Met Arg Ala Met Phe Pro Glu Glu Glu Val Gly Gly Arg Ser Pro Leu
 260 265 270

Thr Thr Pro Trp Arg Ser Pro His Val Gln Arg Gly Ala Ala Ile Gly
 275 280 285
 Thr Arg Trp Ser Thr Arg Ile Pro Arg Phe Pro Leu Pro Glu Gly Arg
 290 295 300
 Thr Glu Ala Gln Tyr Leu Met Glu Leu Thr Phe Lys Gly Leu Leu Arg
 305 310 315 320
 Arg Tyr Pro Asp Arg Ile Thr Glu Gly Phe Tyr Arg Glu Val Phe Arg
 325 330 335
 Leu Ser Gly Lys Leu Pro Pro His Gly Asp Gly Glu Ala Leu Ala Glu
 340 345 350
 Ala Leu Ala Gln Val Glu Arg Glu Ala Trp Glu Arg Leu Met Lys Ser
 355 360 365
 Leu Pro Pro Leu Ala Gly Val Lys Glu Trp Thr Ala Glu Ala Ile Phe
 370 375 380
 His Arg Ala Leu Tyr Glu Leu Ser Ala Ile Glu Arg Met Gly Phe Pro
 385 390 395 400
 Gly Leu Leu Pro His Arg Pro Gly Leu His Gln Leu Gly Pro Glu Lys
 405 410 415
 Gly Val Ser Val Gly Pro Gly Arg Gly Gly Ala Ala Gly Ser Leu Val
 420 425 430
 Ala Tyr Ala Val Gly Ile Thr Asn Ile Asp Pro Leu Arg Phe Gly Leu
 435 440 445
 Leu Phe Glu Arg Phe Leu Asn Pro Glu Arg Val Ser Met Pro Asp Ile
 450 455 460
 Asp Thr Asp Phe Ser Asp Arg Glu Arg Asp Arg Val Ile Gln Tyr Val
 465 470 475 480
 Arg Glu Arg Tyr Gly Glu Asp Lys Val Ala Gln Ile Gly Thr Leu Gly
 485 490 495
 Ser Leu Ala Ser Lys Ala Ala Leu Lys Glu Val Ala Arg Val Tyr Gly
 500 505 510
 Ile Pro Arg Lys Lys Ala Glu Glu Leu Ala Lys Leu Ile Pro Val Gln
 515 520 525

Phe Gly Lys Pro Lys Pro Leu Gln Glu Ala Ile Gln Val Val Pro Glu
 530 535 540
 Leu Arg Ala Glu Met Glu Lys Asp Pro Lys Val Arg Glu Val Leu Glu
 545 550 555 560
 Val Ala Met Arg Leu Glu Gly Leu Asn Arg His Ala Ser Val His Ala
 565 570 575
 Gly Arg Gly Gly Val Phe Ser Glu Pro Leu Thr Asp Leu Val Pro Leu
 580 585 590
 Cys Ala Thr Arg Lys Gly Gly Pro Tyr Thr Gln Tyr Asp Met Gly Ala
 595 600 605
 Val Glu Ala Leu Gly Leu Leu Lys Met Asp Phe Leu Gly Leu Arg Thr
 610 615 620
 Leu Thr Phe Leu Asp Glu Val Lys Arg Ile Val Lys Ala Ser Gln Gly
 625 630 635 640
 Val Glu Leu Asp Tyr Asp Ala Leu Pro Leu Asp Asp Pro Lys Thr Phe
 645 650 655
 Ala Leu Leu Ser Arg Gly Glu Thr Lys Gly Val Phe Gln Leu Glu Ser
 660 665 670
 Gly Gly Met Thr Ala Thr Leu Arg Gly Leu Lys Pro Arg Arg Phe Glu
 675 680 685
 Asp Leu Ile Ala Ile Leu Ser Leu Tyr Arg Pro Gly Pro Met Glu His
 690 695 700
 Ile Pro Thr Tyr Ile Arg Arg His His Gly Leu Glu Pro Val Ser Tyr
 705 710 715 720
 Ser Glu Phe Pro His Ala Glu Lys Tyr Leu Lys Pro Ile Leu Asp Glu
 725 730 735
 Thr Tyr Gly Ile Pro Val Tyr Gln Glu Gln Ile Met Gln Ile Ala Ser
 740 745 750
 Ala Val Ala Gly Tyr Ser Leu Gly Glu Ala Asp Leu Leu Arg Arg Ser
 755 760 765
 Met Gly Lys Lys Lys Val Glu Glu Met Lys Ser His Arg Glu Arg Phe
 770 775 780

Val	Gln	Gly	Ala	Lys	Glu	Arg	Gly	Val	Pro	Glu	Glu	Glu	Ala	Asn	Arg		785		790		795		800
Leu	Phe	Asp	Met	Leu	Glu	Ala	Phe	Ala	Asn	Tyr	Gly	Phe	Asn	Lys	Ser			805		810		815	
His	Ala	Ala	Ala	Tyr	Ser	Leu	Leu	Ser	Tyr	Gln	Thr	Ala	Tyr	Val	Lys			820		825		830	
Ala	His	Tyr	Pro	Val	Glu	Phe	Met	Ala	Ala	Leu	Leu	Ser	Val	Glu	Arg			835		840		845	
His	Asp	Ser	Asp	Lys	Val	Ala	Glu	Tyr	Ile	Arg	Asp	Ala	Arg	Ala	Met		850		855		860		
Gly	Ile	Glu	Val	Leu	Pro	Pro	Asp	Val	Asn	Arg	Ser	Gly	Phe	Asp	Phe		865		870		875		880
Leu	Val	Gln	Gly	Arg	Gln	Ile	Leu	Phe	Gly	Leu	Ser	Ala	Val	Lys	Asn			885		890		895	
Val	Gly	Glu	Ala	Ala	Ala	Glu	Ala	Ile	Leu	Arg	Glu	Arg	Glu	Arg	Gly			900		905		910	
Gly	Pro	Tyr	Arg	Ser	Leu	Gly	Asp	Phe	Leu	Lys	Arg	Leu	Asp	Glu	Lys		915		920		925		
Val	Leu	Asn	Lys	Arg	Thr	Leu	Glu	Ser	Leu	Ile	Lys	Ala	Gly	Ala	Leu		930		935		940		
Asp	Gly	Phe	Gly	Glu	Arg	Ala	Arg	Leu	Leu	Ala	Ser	Leu	Glu	Gly	Leu		945		950		955		960
Leu	Lys	Trp	Ala	Ala	Glu	Asn	Arg	Glu	Lys	Ala	Arg	Ser	Gly	Met	Met			965		970		975	
Gly	Leu	Phe	Ser	Glu	Val	Glu	Glu	Pro	Pro	Leu	Ala	Glu	Ala	Ala	Pro			980		985		990	
Leu	Asp	Glu	Ile	Thr	Arg	Leu	Arg	Tyr	Glu	Lys	Glu	Ala	Leu	Gly	Ile		995		1000		1005		
Tyr	Val	Ser	Gly	His	Pro	Ile	Leu	Arg	Tyr	Pro	Gly	Leu	Arg	Glu	Thr		1010		1015		1020		
Ala	Thr	Cys	Thr	Leu	Glu	Glu	Leu	Pro	His	Leu	Ala	Arg	Asp	Leu	Pro		1025		1030		1035		1040

Pro Arg Ser Arg Val Leu Leu Ala Gly Met Val Glu Glu Val Val Arg
1045 1050 1055

Lys Pro Thr Lys Ser Gly Gly Met Met Ala Arg Phe Val Leu Ser Asp
1060 1065 1070

Glu Thr Gly Ala Leu Glu Ala Val Ala Phe Gly Arg Ala Tyr Asp Gln
1075 1080 1085

Val Ser Pro Arg Leu Lys Glu Asp Thr Pro Val Leu Val Leu Ala Glu
1090 1095 1100

Val Glu Arg Glu Glu Gly Gly Val Arg Val Leu Ala Gln Ala Val Trp
1105 1110 1115 1120

Thr Tyr Gln Glu Leu Glu Gln Val Pro Arg Ala Leu Glu Val Glu Val
1125 1130 1135

Glu Ala Ser Leu Pro Asp Asp Arg Gly Val Ala His Leu Lys Ser Leu
1140 1145 1150

Leu Asp Glu His Ala Gly Thr Leu Pro Leu Tyr Val Arg Val Gln Gly
1155 1160 1165

Ala Phe Gly Glu Ala Leu Leu Ala Leu Arg Glu Val Arg Val Gly Glu
1170 1175 1180

Glu Ala Leu Gly Ala Leu Glu Ala Ala Gly Phe Pro Ala Tyr Leu Leu
1185 1190 1195 1200

Pro Asn Arg Glu Val Ser Pro Arg Leu Thr Gly Ser Gly Gly Pro Arg
1205 1210 1215

Gly Arg Ala Leu Ser Thr Gly Leu Ala Leu Lys Thr Tyr Pro Ile Ala
1220 1225 1230

Leu Pro Gly Gly Asn Glu Ala Leu Ala Arg Pro Leu Leu
1235 1240 1245

<210> 88

<211> 198

<212> PRT

<213> *Thermus thermophilus*

<400> 88

Val Glu Arg Val Val Arg Thr Leu Leu Asp Gly Arg Phe Leu Leu Glu
1 5 10 15

Glu Gly Val Gly Leu Trp Glu Trp Arg Tyr Pro Phe Pro Leu Glu Gly
 20 25 30
 Glu Ala Val Val Val Leu Asp Leu Glu Thr Thr Gly Leu Ala Gly Leu
 35 40 45
 Asp Glu Val Ile Glu Val Gly Leu Leu Arg Leu Glu Gly Gly Arg Arg
 50 55 60
 Leu Pro Phe Gln Ser Leu Val Arg Pro Leu Pro Pro Ala Glu Ala Arg
 65 70 75 80
 Ser Trp Asn Leu Thr Gly Ile Pro Arg Glu Ala Leu Glu Glu Ala Pro
 85 90 95
 Ser Leu Glu Glu Val Leu Glu Lys Ala Tyr Pro Leu Arg Gly Asp Ala
 100 105 110
 Thr Leu Val Ile His Asn Ala Ala Phe Asp Leu Gly Phe Leu Arg Pro
 115 120 125
 Ala Leu Glu Gly Leu Gly Tyr Arg Leu Glu Asn Pro Val Val Asp Ser
 130 135 140
 Leu Arg Leu Ala Arg Arg Gly Leu Pro Gly Leu Arg Arg Tyr Gly Leu
 145 150 155 160
 Asp Ala Leu Ser Glu Val Leu Glu Leu Pro Arg Arg Thr Cys His Arg
 165 170 175
 Ala Leu Glu Asp Val Glu Arg Thr Leu Ala Val Val His Glu Val Tyr
 180 185 190
 Tyr Met Leu Thr Ser Gly
 195

<210> 89

<211> 182

<212> PRT

<213> *Deinococcus radiodurans*

<400> 89

Pro Trp Pro Gln Asp Val Val Val Phe Asp Leu Glu Thr Thr Gly Phe
 1 5 10 15

Ser Pro Ala Ser Ala Ala Ile Val Glu Ile Gly Ala Val Arg Ile Val

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20 25 30

Gly Gly Gln Ile Asp Glu Thr Leu Lys Phe Glu Thr Leu Val Arg Pro
35 40 45

Thr Arg Pro Asp Gly Ser Met Leu Ser Ile Pro Trp Gln Ala Gln Arg
50 55 60

Val His Gly Ile Ser Asp Glu Met Val Arg Arg Ala Pro Ala Xaa Lys
65 70 75 80

Asp Val Leu Pro Asp Phe Phe Asp Phe Val Asp Gly Ser Ala Val Val
85 90 95

Ala His Asn Val Ser Phe Asp Gly Gly Phe Met Arg Ala Gly Ala Glu
100 105 110

Arg Leu Gly Leu Ser Trp Ala Pro Glu Arg Glu Leu Cys Thr Met Gln
115 120 125

Leu Ser Arg Arg Ala Phe Pro Arg Glu Arg Thr His Asn Leu Thr Val
130 135 140

Leu Ala Glu Arg Leu Gly Leu Glu Phe Ala Pro Gly Gly Arg His Arg
145 150 155 160

Ser Tyr Gly Asp Val Gln Val Thr Ala Gln Ala Tyr Leu Arg Leu Leu
165 170 175

Glu Leu Leu Gly Glu Arg
180

<210> 90
<211> 201
<212> PRT
<213> Bacillus subtilis

<400> 90

His Gly Ile Lys Met Ile Tyr Gly Met Glu Ala Asn Leu Val Asp Asp
1 5 10 15

Gly Val Pro Ile Ala Tyr Asn Ala Ala His Arg Leu Leu Glu Glu Glu
20 25 30

Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser Ala Val Tyr
35 40 45

Asp Thr Ile Ile Glu Leu Ala Ala Val Lys Val Lys Gly Gly Glu Ile
 50 55 60
 Ile Asp Lys Phe Glu Ala Phe Ala Asn Pro His Arg Pro Leu Ser Ala
 65 70 75 80
 Thr Ile Ile Glu Leu Thr Gly Ile Thr Asp Asp Met Leu Gln Asp Ala
 85 90 95
 Pro Asp Val Val Asp Val Ile Arg Asp Phe Arg Glu Trp Ile Gly Asp
 100 105 110
 Asp Ile Leu Val Ala His Asn Ala Ser Phe Asp Met Gly Phe Leu Asn
 115 120 125
 Val Ala Tyr Lys Lys Leu Leu Glu Val Glu Lys Ala Lys Asn Pro Val
 130 135 140
 Ile Asp Thr Leu Glu Leu Gly Arg Phe Leu Tyr Pro Glu Phe Lys Asn
 145 150 155 160
 His Arg Leu Asn Thr Leu Cys Lys Lys Phe Asp Ile Glu Leu Thr Gln
 165 170 175
 His His Arg Ala Ile Tyr Asp Thr Glu Ala Thr Ala Tyr Leu Leu Leu
 180 185 190
 Lys Met Leu Lys Asp Ala Ala Glu Lys
 195 200

<210> 91
 <211> 188
 <212> PRT
 <213> Haemophilus influenzae

<400> 91
 Met Ile Asn Pro Asn Arg Gln Ile Val Leu Asp Thr Glu Thr Thr Gly
 1 5 10 15
 Met Asn Gln Leu Gly Ala His Tyr Glu Gly His Cys Ile Ile Glu Ile
 20 25 30
 Gly Ala Val Glu Leu Ile Asn Arg Arg Tyr Thr Gly Asn Asn Xaa His
 35 40 45
 Ile Tyr Ile Lys Pro Asp Arg Pro Xaa Asp Pro Asp Ala Ile Lys Val
 50 55 60

His Gly Ile Thr Asp Glu Met Leu Ala Asp Lys Pro Glu Phe Lys Glu
65 70 75 80

Val Ala Gln Asp Phe Leu Asp Tyr Ile Asn Gly Ala Glu Leu Leu Ile
85 90 95

His Asn Ala Pro Phe Asp Val Gly Phe Met Asp Tyr Glu Phe Arg Lys
100 105 110

Leu Asn Leu Asn Val Lys Thr Asp Asp Ile Cys Leu Val Thr Asp Thr
115 120 125

Leu Gln Met Ala Arg Gln Met Tyr Pro Gly Lys Arg Asn Asn Leu Asp
130 135 140

Ala Leu Cys Asp Arg Leu Gly Ile Asp Asn Ser Lys Arg Thr Leu His
145 150 155 160

Gly Ala Leu Leu Asp Ala Glu Ile Leu Ala Asp Val Tyr Leu Met Met
165 170 175

Thr Gly Gly Gln Thr Asn Leu Phe Asp Glu Glu Glu
180 185

<210> 92

<211> 189

<212> PRT

<213> Escherichia coli

<400> 92

Met Ser Thr Ala Ile Thr Arg Gln Ile Val Leu Asp Thr Glu Thr Thr
1 5 10 15

Gly Met Asn Gln Ile Gly Ala His Ser Glu Gly His Lys Ile Ile Glu
20 25 30

Ile Gly Ala Val Glu Val Val Asn Arg Arg Leu Thr Gly Asn Asn Phe
35 40 45

His Val Tyr Leu Lys Asp Arg Leu Val Asp Pro Glu Ala Phe Gly Val
50 55 60

His Gly Ile Ala Val Asp Phe Leu Leu Asp Lys Pro Thr Phe Ala Glu
65 70 75 80

Val Ala Val Glu Phe Met Asp Tyr Ile Arg Gly Ala Glu Leu Val Ile

85

90

95

His Asn Ala Ala Phe Asp Ile Gly Phe Met Asp Tyr Glu Phe Ser Leu
 100 105 110

Leu Lys Arg Asp Ile Ala Lys Thr Asn Thr Phe Cys Lys Val Thr Asp
 115 120 125

Ser Leu Ala Val Ala Arg Lys Met Phe Pro Gly Lys Arg Asn Ser Leu
 130 135 140

Asp Ala Leu Cys Ala Arg Tyr Glu Ile Asp Asn Ser Lys Arg Thr Leu
 145 150 155 160

His Gly Ala Leu Leu Asp Ala Gln Ile Leu Ala Glu Val Tyr Leu Ala
 165 170 175

Met Thr Gly Gly Gln Thr Ser Met Ala Phe Ala Met Glu
 180 185

<210> 93

<211> 201

<212> PRT

<213> Helicobacter pylori

<400> 93

Asn Leu Glu Tyr Leu Lys Ala Cys Gly Leu Asn Phe Ile Glu Thr Ser
 1 5 10 15

Glu Asn Leu Ile Thr Leu Lys Asn Leu Lys Thr Pro Leu Lys Asp Glu
 20 25 30

Val Phe Ser Phe Ile Asp Leu Glu Thr Thr Gly Ser Cys Pro Ile Lys
 35 40 45

His Glu Ile Leu Glu Ile Gly Ala Val Gln Val Lys Gly Gly Glu Ile
 50 55 60

Ile Asn Arg Phe Glu Thr Leu Val Lys Val Lys Ser Val Pro Asp Tyr
 65 70 75 80

Ile Ala Glu Leu Thr Gly Ile Thr Tyr Glu Asp Thr Leu Asn Ala Pro
 85 90 95

Ser Ala His Glu Ala Leu Gln Glu Leu Arg Leu Phe Leu Gly Asn Ser
 100 105 110

Val Phe Val Ala His Asn Ala Asn Phe Asp Tyr Asn Phe Leu Gly Arg
115 120 125

Tyr Phe Val Glu Lys Leu His Cys Pro Leu Leu Asn Leu Lys Leu Cys
130 135 140

Thr Leu Asp Leu Ser Lys Arg Ala Ile Leu Ser Met Arg Tyr Ser Leu
145 150 155 160

Ser Phe Leu Lys Glu Leu Leu Gly Phe Gly Ile Glu Val Ser His Arg
165 170 175

Ala Tyr Ala Asp Ala Leu Ala Ser Tyr Lys Leu Phe Glu Ile Cys Leu
180 185 190

Leu Asn Leu Pro Ser Tyr Ile Lys Thr
195 200

<210> 94
<211> 630
<212> DNA
<213> Thermus thermophilus

<400> 94
atggtggagc ggggtggtgcg gacccttctg gacgggaggt tcctcctgga ggaggggggtg 60
gggcttttggg agtggcgcta cccctttccc ctggagggggg aggcggtggt ggtcctggac 120
ctggagacca cggggcttgc cggcctggac gaggtgattg aggtgggcct cctccgcctg 180
gaggggggga ggcgccctccc cttccagagc ctggtccggc ccctcccgcc cgccgaagcc 240
cgttcgtgga acctcaccgg catcccccg gaggccctgg aggaggcccc ctccctggag 300
gaggttcttg agaaggccta ccccctccgc ggcgacgcca ccttggtgat ccacaacgcc 360
gcctttgacc tgggcttctt cgcgccggcc ttggaggggc tgggctaccg cctggaaaac 420
cccgtggtgg actccctgcg cttggccaga cggggcttac caggccttag gcgctacggc 480
ctggacgccc tctccgaggt cctggagctt ccccgaagga cctgccaccg ggccctcgag 540
gacgtggagc gcaccctcgc cgtggtgcac gaggtatact atatgcttac gtccggccgt 600
ccccgcacgc tttgggaact cgggaggtag 630

<210> 95
<211> 210
<212> PRT
<213> Thermus thermophilus

<400> 95
Met Val Glu Arg Val Val Arg Thr Leu Leu Asp Gly Arg Phe Leu Leu
1 5 10 15

Glu Glu Gly Val Gly Leu Trp Glu Trp Arg Tyr Pro Phe Pro Leu Glu

20

25

30

Gly Glu Ala Val Val Val Leu Asp Leu Glu Thr Thr Gly Leu Ala Gly
 35 40 45

Leu Asp Glu Val Ile Glu Val Gly Leu Leu Arg Leu Glu Gly Gly Arg
 50 55 60

Arg Leu Pro Phe Gln Ser Leu Val Arg Pro Leu Pro Pro Ala Glu Ala
 65 70 75 80

Arg Ser Trp Asn Leu Thr Gly Ile Pro Arg Glu Ala Leu Glu Glu Ala
 85 90 95

Pro Ser Leu Glu Glu Val Leu Glu Lys Ala Tyr Pro Leu Arg Gly Asp
 100 105 110

Ala Thr Leu Val Ile His Asn Ala Ala Phe Asp Leu Gly Phe Leu Arg
 115 120 125

Pro Ala Leu Glu Gly Leu Gly Tyr Arg Leu Glu Asn Pro Val Val Asp
 130 135 140

Ser Leu Arg Leu Ala Arg Arg Gly Leu Pro Gly Leu Arg Arg Tyr Gly
 145 150 155 160

Leu Asp Ala Leu Ser Glu Val Leu Glu Leu Pro Arg Arg Thr Cys His
 165 170 175

Arg Ala Leu Glu Asp Val Glu Arg Thr Leu Ala Val Val His Glu Val
 180 185 190

Tyr Tyr Met Leu Thr Ser Gly Arg Pro Arg Thr Leu Trp Glu Leu Gly
 195 200 205

Arg Glx
 210

<210> 96

<211> 461

<212> PRT

<213> *Pseudomonas marcesans*

<400> 96

Met Leu Glu Ala Ser Trp Glu Lys Val Gln Ser Ser Leu Lys Gln Asn
 1 5 10 15

Leu Ser Lys Pro Ser Tyr Glu Thr Trp Ile Arg Pro Thr Glu Phe Ser
 20 25 30

Gly Phe Lys Asn Gly Glu Leu Thr Leu Ile Ala Pro Asn Ser Phe Ser
 35 40 45

Ser Ala Trp Leu Lys Asn Asn Tyr Ser Gln Thr Ile Gln Glu Thr Ala
 50 55 60

Glu Glu Ile Phe Gly Glu Pro Val Thr Val His Val Lys Val Lys Ala
 65 70 75 80

Asn Ala Glu Ser Ser Asp Glu His Tyr Ser Ser Ala Pro Ile Thr Pro
 85 90 95

Pro Leu Glu Ala Ser Pro Gly Ser Val Asp Ser Ser Gly Ser Ser Leu
 100 105 110

Arg Leu Ser Lys Lys Thr Leu Pro Leu Leu Asn Leu Arg Tyr Val Phe
 115 120 125

Asn Arg Phe Val Val Gly Pro Asn Ser Arg Met Ala His Ala Ala Ala
 130 135 140

Met Ala Val Ala Glu Ser Pro Gly Arg Glu Phe Asn Pro Leu Phe Ile
 145 150 155 160

Cys Gly Gly Val Gly Leu Gly Lys Thr His Leu Met Gln Ala Ile Gly
 165 170 175

His Tyr Arg Leu Glu Ile Asp Pro Gly Ala Lys Val Ser Tyr Val Ser
 180 185 190

Thr Glu Thr Phe Thr Asn Asp Leu Ile Leu Ala Ile Arg Gln Asp Arg
 195 200 205

Met Gln Ala Phe Arg Asp Arg Tyr Arg Ala Ala Asp Leu Ile Leu Val
 210 215 220

Asp Asp Ile Gln Phe Ile Glu Gly Lys Glu Tyr Thr Gln Glu Glu Phe
 225 230 235 240

Phe His Thr Phe Asn Ala Leu His Asp Ala Gly Ser Gln Ile Val Leu
 245 250 255

Ala Ser Asp Arg Pro Pro Ser Gln Ile Pro Arg Leu Gln Glu Arg Leu
 260 265 270

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Met Ser Arg Phe Ser Met Gly Leu Ile Ala Asp Val Gln Ala Pro Asp
 275 280 285
 Leu Glu Thr Arg Met Ala Ile Leu Gln Lys Lys Ala Glu His Glu Arg
 290 295 300
 Val Gly Leu Pro Arg Asp Leu Ile Gln Phe Ile Ala Gly Arg Phe Thr
 305 310 315 320
 Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Thr Arg Ala Ile Ala Phe
 325 330 335
 Ala Ser Ile Thr Gly Leu Pro Met Thr Val Asp Ser Ile Ala Pro Met
 340 345 350
 Leu Asp Pro Asn Gly Gln Gly Val Glu Val Thr Pro Lys Gln Val Leu
 355 360 365
 Asp Lys Val Ala Glu Val Phe Lys Val Thr Pro Asp Glu Met Arg Ser
 370 375 380
 Ala Ser Arg Arg Arg Pro Val Ser Gln Ala Arg Gln Val Gly Met Tyr
 385 390 395 400
 Leu Met Arg Gln Gly Thr Asn Leu Ser Leu Pro Arg Ile Gly Asp Thr
 405 410 415
 Phe Gly Gly Lys Asp His Thr Thr Val Met Tyr Ala Ile Glu Gln Val
 420 425 430
 Glu Lys Lys Leu Ser Ser Asp Pro Gln Ile Ala Ser Gln Val Gln Lys
 435 440 445
 Ile Arg Asp Leu Leu Gln Ile Asp Ser Arg Arg Lys Arg
 450 455 460

<210> 97

<211> 447

<212> PRT

<213> Synechocystis sp.

<400> 97

Met Val Ser Cys Glu Asn Leu Trp Gln Gln Ala Leu Ala Ile Leu Ala
 1 5 10 15

Thr Gln Leu Thr Lys Pro Ala Phe Asp Thr Trp Ile Lys Ala Ser Val
 20 25 30

Leu Ile Ser Leu Gly Asp Gly Val Ala Thr Ile Gln Val Glu Asn Gly
 35 40 45
 Phe Val Leu Asn His Leu Gln Lys Ser Tyr Gly Pro Leu Leu Met Glu
 50 55 60
 Val Leu Thr Asp Leu Thr Gly Gln Glu Ile Thr Val Lys Leu Ile Thr
 65 70 75 80
 Asp Gly Leu Glu Pro His Ser Leu Ile Gly Gln Glu Ser Ser Leu Pro
 85 90 95
 Met Glu Thr Thr Pro Lys Asn Ala Thr Ala Leu Asn Gly Lys Tyr Thr
 100 105 110
 Phe Ser Arg Phe Val Val Gly Pro Thr Asn Arg Met Ala His Ala Ala
 115 120 125
 Ser Leu Ala Val Ala Glu Ser Pro Gly Arg Glu Phe Asn Pro Leu Phe
 130 135 140
 Leu Cys Gly Gly Val Gly Leu Gly Lys Thr His Leu Met Gln Ala Ile
 145 150 155 160
 Ala His Tyr Arg Leu Glu Met Tyr Pro Asn Ala Lys Val Tyr Tyr Val
 165 170 175
 Ser Thr Glu Arg Phe Thr Asn Asp Leu Ile Thr Ala Ile Arg Gln Asp
 180 185 190
 Asn Met Glu Asp Phe Arg Ser Tyr Tyr Arg Ser Ala Asp Phe Leu Leu
 195 200 205
 Ile Asp Asp Ile Gln Phe Ile Lys Gly Lys Glu Tyr Thr Gln Glu Glu
 210 215 220
 Phe Phe His Thr Phe Asn Ser Leu His Glu Ala Gly Lys Gln Val Val
 225 230 235 240
 Val Ala Ser Asp Arg Ala Pro Gln Arg Ile Pro Gly Leu Gln Asp Arg
 245 250 255
 Leu Ile Ser Arg Phe Ser Met Gly Leu Ile Ala Asp Ile Gln Val Pro
 260 265 270
 Asp Leu Glu Thr Arg Met Ala Ile Leu Gln Lys Lys Ala Glu Tyr Asp
 275 280 285

Arg Ile Arg Leu Pro Lys Glu Val Ile Glu Tyr Ile Ala Ser His Tyr
 290 295 300

Thr Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Ile Arg Ala Ile Ala
 305 310 315 320

Tyr Thr Ser Leu Ser Asn Val Ala Met Thr Val Glu Asn Ile Ala Pro
 325 330 335

Val Leu Asn Pro Pro Val Glu Lys Val Ala Ala Ala Pro Glu Thr Ile
 340 345 350

Ile Thr Ile Val Ala Gln His Tyr Gln Leu Lys Val Glu Glu Leu Leu
 355 360 365

Ser Asn Ser Arg Arg Arg Glu Val Ser Leu Ala Arg Gln Val Gly Met
 370 375 380

Tyr Leu Met Arg Gln His Thr Asp Leu Ser Leu Pro Arg Ile Gly Glu
 385 390 395 400

Ala Phe Gly Gly Lys Asp His Thr Thr Val Met Tyr Ser Cys Asp Lys
 405 410 415

Ile Thr Gln Leu Gln Gln Lys Asp Trp Glu Thr Ser Gln Thr Leu Thr
 420 425 430

Ser Leu Ser His Arg Ile Asn Ile Ala Gly Gln Ala Pro Glu Ser
 435 440 445

<210> 98

<211> 446

<212> PRT

<213> Bacillus subtilis

<400> 98

Met Glu Asn Ile Leu Asp Leu Trp Asn Gln Ala Leu Ala Gln Ile Glu
 1 5 10 15

Lys Lys Leu Ser Lys Pro Ser Phe Glu Thr Trp Met Lys Ser Thr Lys
 20 25 30

Ala His Ser Leu Gln Gly Asp Thr Leu Thr Ile Thr Ala Pro Asn Glu
 35 40 45

Phe Ala Arg Asp Trp Leu Glu Ser Arg Tyr Leu His Leu Ile Ala Asp

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50		55		60
Thr Ile Tyr Glu Leu Thr Gly Glu Glu Leu Ser Ile Lys Phe Val Ile				
65		70		75
				80
Pro Gln Asn Gln Asp Val Glu Asp Phe Met Pro Lys Pro Gln Val Lys				
	85		90	95
Lys Ala Val Lys Glu Asp Thr Ser Asp Phe Pro Gln Asn Met Leu Asn				
	100		105	110
Pro Lys Tyr Thr Phe Asp Thr Phe Val Ile Gly Ser Gly Asn Arg Phe				
	115		120	125
Ala His Ala Ala Ser Leu Ala Val Ala Glu Ala Pro Ala Lys Ala Tyr				
	130		135	140
Asn Pro Leu Phe Ile Tyr Gly Gly Val Gly Leu Gly Lys Thr His Leu				
145		150		155
				160
Met His Ala Ile Gly His Tyr Val Ile Asp His Asn Pro Ser Ala Lys				
	165		170	175
Val Val Tyr Leu Ser Ser Glu Lys Phe Thr Asn Glu Phe Ile Asn Ser				
	180		185	190
Ile Arg Asp Asn Lys Ala Val Asp Phe Arg Asn Arg Tyr Arg Asn Val				
	195		200	205
Asp Val Leu Leu Ile Asp Asp Ile Gln Phe Leu Ala Gly Lys Glu Gln				
	210		215	220
Thr Gln Glu Glu Phe Phe His Thr Phe Asn Thr Leu His Glu Glu Ser				
225		230		235
				240
Lys Gln Ile Val Ile Ser Ser Asp Arg Pro Pro Lys Glu Ile Pro Thr				
	245		250	255
Leu Glu Asp Arg Leu Arg Ser Arg Phe Glu Trp Gly Leu Ile Thr Asp				
	260		265	270
Ile Thr Pro Pro Asp Leu Glu Thr Arg Ile Ala Ile Leu Arg Lys Lys				
	275		280	285
Ala Lys Ala Glu Gly Leu Asp Ile Pro Asn Glu Val Met Leu Tyr Ile				
	290		295	300
Ala Asn Gln Ile Asp Ser Asn Ile Arg Glu Leu Glu Gly Ala Leu Ile				

305 310 315 320
 Arg Val Val Ala Tyr Ser Ser Leu Ile Asn Lys Asp Ile Asn Ala Asp
 325 330 335
 Leu Ala Ala Glu Ala Leu Lys Asp Ile Ile Pro Ser Ser Lys Pro Lys
 340 345 350
 Val Ile Thr Ile Lys Glu Ile Gln Arg Val Val Gly Gln Gln Phe Asn
 355 360 365
 Ile Lys Leu Glu Asp Phe Lys Ala Lys Lys Arg Thr Lys Ser Val Ala
 370 375 380
 Phe Pro Arg Gln Ile Ala Met Tyr Leu Ser Arg Glu Met Thr Asp Ser
 385 390 395 400
 Ser Leu Pro Lys Ile Gly Glu Glu Phe Gly Gly Arg Asp His Thr Thr
 405 410 415
 Val Ile His Ala His Glu Lys Ile Ser Lys Leu Leu Ala Asp Asp Glu
 420 425 430
 Gln Leu Gln Gln His Val Lys Glu Ile Lys Glu Gln Leu Lys
 435 440 445

 <210> 99
 <211> 507
 <212> PRT
 <213> Mycobacterium tuberculosis

 <400> 99
 Met Thr Asp Asp Pro Gly Ser Gly Phe Thr Thr Val Trp Asn Ala Val
 1 5 10 15
 Val Ser Glu Leu Asn Gly Asp Pro Lys Val Asp Asp Gly Pro Ser Ser
 20 25 30
 Asp Ala Asn Leu Ser Ala Pro Leu Thr Pro Gln Gln Arg Ala Trp Leu
 35 40 45
 Asn Leu Val Gln Pro Leu Thr Ile Val Glu Gly Phe Ala Leu Leu Ser
 50 55 60
 Val Pro Ser Ser Phe Val Gln Asn Glu Ile Glu Arg His Leu Arg Ala
 65 70 75 80

Pro Ile Thr Asp Ala Leu Ser Arg Arg Leu Gly His Gln Ile Gln Leu
 85 90 95
 Gly Val Arg Ile Ala Pro Pro Ala Thr Asp Glu Ala Asp Asp Thr Thr
 100 105 110
 Val Pro Pro Ser Glu Asn Pro Ala Thr Thr Ser Pro Asp Thr Thr Thr
 115 120 125
 Asp Asn Asp Glu Ile Asp Asp Ser Ala Ala Ala Arg Gly Asp Asn Gln
 130 135 140
 His Ser Trp Pro Ser Tyr Phe Thr Glu Arg Pro His Asn Thr Asp Ser
 145 150 155 160
 Ala Thr Ala Gly Val Thr Ser Leu Asn Arg Arg Tyr Thr Phe Asp Thr
 165 170 175
 Phe Val Ile Gly Ala Ser Asn Arg Phe Ala His Ala Ala Ala Leu Ala
 180 185 190
 Ile Ala Glu Ala Pro Ala Arg Ala Tyr Asn Pro Leu Phe Ile Trp Gly
 195 200 205
 Glu Ser Gly Leu Gly Lys Thr His Leu Leu His Ala Ala Gly Asn Tyr
 210 215 220
 Ala Gln Arg Leu Phe Pro Gly Met Arg Val Lys Tyr Val Ser Thr Glu
 225 230 235 240
 Glu Phe Thr Asn Asp Phe Ile Asn Ser Leu Arg Asp Asp Arg Lys Val
 245 250 255
 Ala Phe Lys Arg Ser Tyr Arg Asp Val Asp Val Leu Leu Val Asp Asp
 260 265 270
 Ile Gln Phe Ile Glu Gly Lys Glu Gly Ile Gln Glu Glu Phe Phe His
 275 280 285
 Thr Phe Asn Thr Leu His Asn Ala Asn Lys Gln Ile Val Ile Ser Ser
 290 295 300
 Asp Arg Pro Pro Lys Gln Leu Ala Thr Leu Glu Asp Arg Leu Arg Thr
 305 310 315 320
 Arg Phe Glu Trp Gly Leu Ile Thr Asp Val Gln Pro Pro Glu Leu Glu
 325 330 335

Thr Arg Ile Ala Ile Leu Arg Lys Lys Ala Gln Met Glu Arg Leu Ala
 340 345 350
 Val Pro Asp Asp Val Leu Glu Leu Ile Ala Ser Ser Ile Glu Arg Asn
 355 360 365
 Ile Arg Glu Leu Glu Gly Ala Leu Ile Arg Val Thr Ala Phe Ala Ser
 370 375 380
 Leu Asn Lys Thr Pro Ile Asp Lys Ala Leu Ala Glu Ile Val Leu Arg
 385 390 395 400
 Asp Leu Ile Ala Asp Ala Asn Thr Met Gln Ile Ser Ala Ala Thr Ile
 405 410 415
 Met Ala Ala Thr Ala Glu Tyr Phe Asp Thr Thr Val Glu Glu Leu Arg
 420 425 430
 Gly Pro Gly Lys Thr Arg Ala Leu Ala Gln Ser Arg Gln Ile Ala Met
 435 440 445
 Tyr Leu Cys Arg Glu Leu Thr Asp Leu Ser Leu Pro Lys Ile Gly Gln
 450 455 460
 Ala Phe Gly Arg Asp His Thr Thr Val Met Tyr Ala Gln Arg Lys Ile
 465 470 475 480
 Leu Ser Glu Met Ala Glu Arg Arg Glu Val Phe Asp His Val Lys Glu
 485 490 495
 Leu Thr Thr Arg Ile Arg Gln Arg Ser Lys Arg
 500 505

<210> 100

<211> 446

<212> PRT

<213> Thermus thermophilus

<400> 100

Met Ser His Glu Ala Val Trp Gln His Val Leu Glu His Ile Arg Arg
 1 5 10 15

Ser Ile Thr Glu Val Glu Phe His Thr Trp Phe Glu Arg Ile Arg Pro
 20 25 30

Leu Gly Ile Arg Asp Gly Val Leu Glu Leu Ala Val Pro Thr Ser Phe
 35 40 45

Ala Leu Asp Trp Ile Arg Arg His Tyr Ala Gly Leu Ile Gln Glu Gly
 50 55 60
 Pro Arg Leu Leu Gly Ala Gln Ala Pro Arg Phe Glu Leu Arg Val Val
 65 70 75 80
 Pro Gly Val Val Val Gln Glu Asp Ile Phe Gln Pro Pro Pro Ser Pro
 85 90 95
 Pro Ala Gln Ala Gln Pro Glu Asp Thr Phe Lys Thr Ser Trp Trp Gly
 100 105 110
 Pro Thr Thr Pro Trp Pro His Gly Gly Ala Val Ala Val Ala Glu Ser
 115 120 125
 Pro Gly Arg Ala Tyr Asn Pro Leu Phe Ile Tyr Gly Gly Arg Gly Leu
 130 135 140
 Gly Lys Thr Tyr Leu Met His Ala Val Gly Pro Leu Arg Ala Lys Arg
 145 150 155 160
 Phe Pro His Met Arg Leu Glu Tyr Val Ser Thr Glu Thr Phe Thr Asn
 165 170 175
 Glu Leu Ile Asn Arg Pro Ser Ala Arg Asp Arg Met Thr Glu Phe Arg
 180 185 190
 Glu Arg Tyr Arg Ser Val Asp Leu Leu Leu Val Asp Asp Val Gln Phe
 195 200 205
 Ile Ala Gly Lys Glu Arg Thr Gln Glu Glu Phe Phe His Thr Phe Asn
 210 215 220
 Ala Leu Tyr Glu Ala His Lys Gln Ile Ile Leu Ser Ser Asp Arg Pro
 225 230 235 240
 Pro Lys Asp Ile Leu Thr Leu Glu Ala Arg Leu Arg Ser Arg Phe Glu
 245 250 255
 Trp Gly Leu Ile Thr Asp Asn Pro Ala Pro Asp Leu Glu Thr Arg Ile
 260 265 270
 Ala Ile Leu Lys Met Asn Ala Ser Ser Gly Pro Glu Asp Pro Glu Asp
 275 280 285
 Ala Leu Glu Tyr Ile Ala Arg Gln Val Thr Ser Asn Ile Arg Glu Trp
 290 295 300

Glu Gly Ala Leu Met Arg Ala Ser Pro Phe Ala Ser Leu Asn Gly Val
 305 310 315 320

Glu Leu Thr Arg Ala Val Ala Ala Lys Ala Leu Arg His Leu Arg Pro
 325 330 335

Arg Glu Leu Glu Ala Asp Pro Leu Glu Ile Ile Arg Lys Ala Ala Gly
 340 345 350

Pro Val Arg Pro Glu Thr Pro Gly Gly Ala His Gly Glu Arg Arg Lys
 355 360 365

Lys Glu Val Val Leu Pro Arg Gln Leu Ala Met Tyr Leu Val Arg Glu
 370 375 380

Leu Thr Pro Ala Ser Leu Pro Glu Ile Gly Gln Leu Phe Gly Gly Arg
 385 390 395 400

Asp His Thr Thr Val Arg Tyr Ala Ile Gln Lys Val Gln Glu Leu Ala
 405 410 415

Gly Lys Pro Asp Arg Glu Val Gln Gly Leu Leu Arg Thr Leu Arg Glu
 420 425 430

Ala Cys Thr Asp Pro Val Asp Asn Leu Trp Ile Thr Cys Gly
 435 440 445

<210> 101

<211> 467

<212> PRT

<213> Escherichia coli

<400> 101

Met Ser Leu Ser Leu Trp Gln Gln Cys Leu Ala Arg Leu Gln Asp Glu
 1 5 10 15

Leu Pro Ala Thr Glu Phe Ser Met Trp Ile Arg Pro Leu Gln Ala Glu
 20 25 30

Leu Ser Asp Asn Thr Leu Ala Leu Tyr Ala Pro Asn Arg Phe Val Leu
 35 40 45

Asp Trp Val Arg Asp Lys Tyr Leu Asn Asn Ile Asn Gly Leu Leu Thr
 50 55 60

Ser Phe Cys Gly Ala Asp Ala Pro Gln Leu Arg Phe Glu Val Gly Thr

65		70		75		80									
Lys	Pro	Val	Thr	Gln	Thr	Pro	Gln	Ala	Ala	Val	Thr	Ser	Asn	Val	Ala
				85					90					95	
Ala	Pro	Ala	Gln	Val	Ala	Gln	Thr	Gln	Pro	Gln	Arg	Ala	Ala	Pro	Ser
			100					105						110	
Thr	Arg	Ser	Gly	Trp	Asp	Asn	Val	Pro	Ala	Pro	Ala	Glu	Pro	Thr	Tyr
			115				120					125			
Arg	Ser	Asn	Val	Asn	Val	Lys	His	Thr	Phe	Asp	Asn	Phe	Val	Glu	Gly
			130				135					140			
Lys	Ser	Asn	Gln	Leu	Ala	Arg	Ala	Ala	Ala	Arg	Gln	Val	Ala	Asp	Asn
145					150					155					160
Pro	Gly	Gly	Ala	Tyr	Asn	Pro	Leu	Phe	Leu	Tyr	Gly	Gly	Thr	Gly	Leu
				165					170					175	
Gly	Lys	Thr	His	Leu	Leu	His	Ala	Val	Gly	Asn	Gly	Ile	Met	Ala	Arg
			180					185					190		
Lys	Pro	Asn	Ala	Lys	Val	Val	Tyr	Met	His	Ser	Glu	Arg	Phe	Val	Gln
			195				200					205			
Asp	Met	Val	Lys	Ala	Leu	Gln	Asn	Asn	Ala	Ile	Glu	Glu	Phe	Lys	Arg
			210			215					220				
Tyr	Tyr	Arg	Ser	Val	Asp	Ala	Leu	Leu	Ile	Asp	Asp	Ile	Gln	Phe	Phe
225					230					235					240
Ala	Asn	Lys	Glu	Arg	Ser	Gln	Glu	Glu	Phe	Phe	His	Thr	Phe	Asn	Ala
				245					250					255	
Leu	Leu	Glu	Gly	Asn	Gln	Gln	Ile	Ile	Leu	Thr	Ser	Asp	Arg	Tyr	Pro
			260				265						270		
Lys	Glu	Ile	Asn	Gly	Val	Glu	Asp	Arg	Leu	Lys	Ser	Arg	Phe	Gly	Trp
			275				280					285			
Gly	Leu	Thr	Val	Ala	Ile	Glu	Pro	Pro	Glu	Leu	Glu	Thr	Arg	Val	Ala
			290			295					300				
Ile	Leu	Met	Lys	Lys	Ala	Asp	Glu	Asn	Asp	Ile	Arg	Leu	Pro	Gly	Glu
305					310					315				320	
Val	Ala	Phe	Phe	Ile	Ala	Lys	Arg	Leu	Arg	Ser	Asn	Val	Arg	Glu	Leu

325

330

335

Glu Gly Ala Leu Asn Arg Val Ile Ala Asn Ala Asn Phe Thr Gly Arg
 340 345 350

Ala Ile Thr Ile Asp Phe Val Arg Glu Ala Leu Arg Asp Leu Leu Ala
 355 360 365

Leu Gln Glu Lys Leu Val Thr Ile Asp Asn Ile Gln Lys Thr Val Ala
 370 375 380

Glu Tyr Tyr Lys Ile Lys Val Ala Asp Leu Leu Ser Lys Arg Arg Ser
 385 390 395 400

Arg Ser Val Ala Arg Pro Arg Gln Met Ala Met Ala Leu Ala Lys Glu
 405 410 415

Leu Thr Asn His Ser Leu Pro Glu Ile Gly Asp Ala Phe Gly Gly Arg
 420 425 430

Asp His Thr Thr Val Leu His Ala Cys Arg Lys Ile Glu Gln Leu Arg
 435 440 445

Glu Glu Ser His Asp Ile Lys Glu Asp Phe Ser Asn Leu Ile Arg Thr
 450 455 460

Leu Ser Ser
 465

<210> 102

<211> 440

<212> PRT

<213> *Thermatoga maritima*

<400> 102

Met Lys Glu Arg Ile Leu Gln Glu Ile Lys Thr Arg Val Asn Arg Lys
 1 5 10 15

Ser Trp Glu Leu Trp Phe Ser Ser Phe Asp Val Lys Ser Ile Glu Gly
 20 25 30

Asn Lys Val Val Phe Ser Val Gly Asn Leu Phe Ile Lys Glu Trp Leu
 35 40 45

Glu Lys Lys Tyr Tyr Ser Val Leu Ser Lys Ala Val Lys Val Val Leu
 50 55 60

Gly	Asn	Asp	Ala	Thr	Phe	Glu	Ile	Thr	Tyr	Glu	Ala	Phe	Glu	Pro	His	65	70	75	80
Ser	Ser	Tyr	Ser	Glu	Pro	Leu	Val	Lys	Lys	Arg	Ala	Val	Leu	Leu	Thr	85	90	95	
Pro	Leu	Asn	Pro	Asp	Tyr	Thr	Phe	Glu	Asn	Phe	Val	Val	Gly	Pro	Gly	100	105	110	
Asn	Ser	Phe	Ala	Tyr	His	Ala	Ala	Leu	Glu	Val	Ala	Lys	His	Pro	Gly	115	120	125	
Arg	Tyr	Asn	Pro	Leu	Phe	Ile	Tyr	Gly	Gly	Val	Gly	Leu	Gly	Lys	Thr	130	135	140	
His	Leu	Leu	Gln	Ser	Ile	Gly	Asn	Tyr	Val	Val	Gln	Asn	Glu	Pro	Asp	145	150	155	160
Leu	Arg	Val	Met	Tyr	Ile	Thr	Ser	Glu	Lys	Phe	Leu	Asn	Asp	Leu	Val	165	170	175	
Asp	Ser	Met	Lys	Glu	Gly	Lys	Leu	Asn	Glu	Phe	Arg	Glu	Lys	Tyr	Arg	180	185	190	
Lys	Lys	Val	Asp	Ile	Leu	Leu	Ile	Asp	Asp	Val	Gln	Phe	Leu	Ile	Gly	195	200	205	
Lys	Thr	Gly	Val	Gln	Thr	Glu	Leu	Phe	His	Thr	Phe	Asn	Glu	Leu	His	210	215	220	
Asp	Ser	Gly	Lys	Gln	Ile	Val	Ile	Cys	Ser	Asp	Arg	Glu	Pro	Gln	Lys	225	230	235	240
Leu	Ser	Glu	Phe	Gln	Asp	Arg	Leu	Val	Ser	Arg	Phe	Gln	Met	Gly	Leu	245	250	255	
Val	Ala	Lys	Leu	Glu	Pro	Pro	Asp	Glu	Glu	Thr	Arg	Lys	Ser	Ile	Ala	260	265	270	
Arg	Lys	Met	Leu	Glu	Ile	Glu	His	Gly	Glu	Leu	Pro	Glu	Glu	Val	Leu	275	280	285	
Asn	Phe	Val	Ala	Glu	Asn	Val	Asp	Asp	Asn	Leu	Arg	Arg	Leu	Arg	Gly	290	295	300	
Ala	Ile	Ile	Lys	Leu	Leu	Val	Tyr	Lys	Glu	Thr	Thr	Gly	Lys	Glu	Val	305	310	315	320

Asp Leu Lys Glu Ala Ile Leu Leu Leu Lys Asp Phe Ile Lys Pro Asn
 325 330 335
 Arg Val Lys Ala Met Asp Pro Ile Asp Glu Leu Ile Glu Ile Val Ala
 340 345 350
 Lys Val Thr Gly Val Pro Arg Glu Glu Ile Leu Ser Asn Ser Arg Asn
 355 360 365
 Val Lys Ala Leu Thr Ala Arg Arg Ile Gly Met Tyr Val Ala Lys Asn
 370 375 380
 Tyr Leu Lys Ser Ser Leu Arg Thr Ile Ala Glu Lys Phe Asn Arg Ser
 385 390 395 400
 His Pro Val Val Val Asp Ser Val Lys Lys Val Lys Asp Ser Leu Leu
 405 410 415
 Lys Gly Asn Lys Gln Leu Lys Ala Leu Ile Asp Glu Val Ile Gly Glu
 420 425 430
 Ile Ser Arg Arg Ala Leu Ser Gly
 435 440

<210> 103

<211> 457

<212> PRT

<213> Helicobacter pylori

<400> 103

Met Asp Thr Asn Asn Asn Ile Glu Lys Glu Ile Leu Ala Leu Val Lys
 1 5 10 15
 Gln Asn Pro Lys Val Ser Leu Ile Glu Tyr Glu Asn Tyr Phe Ser Gln
 20 25 30
 Leu Lys Tyr Asn Pro Asn Ala Ser Lys Ser Asp Ile Ala Phe Phe Tyr
 35 40 45
 Ala Pro Asn Gln Val Leu Cys Thr Thr Ile Thr Ala Lys Tyr Gly Ala
 50 55 60
 Leu Leu Lys Glu Ile Leu Ser Gln Asn Lys Val Gly Met His Leu Ala
 65 70 75 80
 His Ser Val Asp Val Arg Ile Glu Val Ala Pro Lys Ile Gln Ile Asn
 85 90 95

Ala Gln Ser Asn Ile Asn Tyr Lys Ala Ile Lys Thr Ser Val Lys Asp
100 105 110

Ser Tyr Thr Phe Glu Asn Phe Val Val Gly Ser Cys Asn Asn Thr Val
115 120 125

Tyr Glu Ile Ala Lys Lys Val Ala Gln Ser Asp Thr Pro Pro Tyr Asn
130 135 140

Pro Val Leu Phe Tyr Gly Gly Thr Gly Leu Gly Lys Thr His Ile Leu
145 150 155 160

Asn Ala Ile Gly Asn His Ala Leu Glu Lys His Lys Lys Val Val Leu
165 170 175

Val Thr Ser Glu Asp Phe Leu Thr Asp Phe Leu Lys His Leu Asp Asn
180 185 190

Lys Thr Met Asp Ser Phe Lys Ala Lys Tyr Arg His Cys Asp Phe Phe
195 200 205

Leu Leu Asp Asp Ala Gln Phe Leu Gln Gly Lys Pro Lys Leu Glu Glu
210 215 220

Glu Phe Phe His Thr Phe Asn Glu Leu His Ala Asn Ser Lys Gln Ile
225 230 235 240

Val Leu Ile Ser Asp Arg Ser Pro Lys Asn Ile Ala Gly Leu Glu Asp
245 250 255

Arg Leu Lys Ser Arg Phe Glu Trp Gly Ile Thr Ala Lys Val Met Pro
260 265 270

Pro Asp Leu Glu Thr Lys Leu Ser Ile Val Lys Gln Lys Cys Gln Leu
275 280 285

Asn Gln Ile Thr Leu Pro Glu Glu Val Met Glu Tyr Ile Ala Gln His
290 295 300

Ile Ser Asp Asn Ile Arg Gln Met Glu Gly Ala Ile Ile Lys Ile Ser
305 310 315 320

Val Asn Ala Asn Leu Met Asn Ala Ser Ile Asp Leu Asn Leu Ala Lys
325 330 335

Thr Val Leu Glu Asp Leu Gln Lys Asp His Ala Glu Gly Ser Ser Leu
340 345 350

Glu Asn Ile Leu Leu Ala Val Ala Gln Ser Leu Asn Leu Lys Ser Ser
 355 360 365

Glu Ile Lys Val Ser Ser Arg Gln Lys Asn Val Ala Leu Ala Arg Lys
 370 375 380

Leu Val Val Tyr Phe Ala Arg Leu Tyr Thr Pro Asn Pro Thr Leu Ser
 385 390 395 400

Leu Ala Gln Phe Leu Asp Leu Lys Asp His Ser Ser Ile Ser Lys Met
 405 410 415

Tyr Ser Gly Val Lys Lys Met Leu Glu Glu Glu Lys Ser Pro Phe Val
 420 425 430

Leu Ser Leu Arg Glu Glu Ile Lys Asn Arg Leu Asn Glu Leu Asn Asp
 435 440 445

Lys Lys Thr Ala Phe Asn Ser Ser Glu
 450 455

<210> 104

<211> 1305

<212> DNA

<213> *Thermus thermophilus*

<400> 104

gtgtcgcacg aggccgtctg gcaacacggt ctggagcaca tccgccgcag catcaccgag 60
 gtggagtcc acacctggtt tgaaaggatc cgccccttgg ggatccggga cggggtgctg 120
 gagctcgccg tgcccacctc ctttgccctg gactggatcc ggcgccacta cgccggcctc 180
 atccaggagg gccctcggtt cctcgggggc caggcgcccc ggtttgagct ccgggtggtg 240
 cccgggggtcg tagtccagga ggacatcttc cagccccgc cgagcccccc ggcccaagct 300
 caaccggaag atacctttaa aacttcgttg tggggcccaa caactccatg gcccacggc 360
 ggcgccgtgg ccgtggccga gtccccggc cgggcctaca acccctctt catctacggg 420
 ggccgtggcc tgggaaagac ctacctgatg cagccgtgg gccactccg tgcgaagcgc 480
 ttccccaca tgagattaga gtacgtttcc acggaaactt tcaccaacga gtcacacaa 540
 cggccatccg cgagggaccg gatgacggag ttccgggagc ggtaccgctc cgtggacctc 600
 ctgctggtgg acgacgtcca gttcatcgcc ggaaaggagc gcaccagga ggagtttttc 660
 cacaccttca acgcccctta cgaggccac aagcagatca tcctctctc cgaccggccg 720
 cccaaggaca tcctcaccct ggaggcgccg ctgaggagcc gctttgagtg gggcctgac 780
 accgacaatc cagccccga cctggaaacc cggatcgcca tcctgaagat gaacgccagc 840
 agcgggcctg aggatccga ggacgcctg gactacatcg cccggcaggt cacctccaac 900
 atccgggagt gggaaggggc cctcatgcgg gcacgcctt tcgcctccct caacggcggt 960
 gagctgacct gcgccgtggc ggccaaggct ctccgacatc ttgcgccag ggagctggag 1020
 gcggaccctc tggagatcat ccgcaaagcg gcgggaccag ttcggcctga aaccccgga 1080
 ggagctcacg gggagcgccg caagaaggag gtggtcctcc cccggcagct cgccatgtac 1140

ctggtgcggg agctcacccc ggctccctg cccgagatcg accagctcaa cgacgaccgg 1200
gaccacacca cggtcctcta cgccatccag aaggtccagg agctcgcgga aagcgaccgg 1260
gaggtgcagg gcctcctccg caccctccgg gaggcgtgca catga 1305

<210> 105

<211> 434

<212> PRT

<213> *Thermus thermophilus*

<400> 105

Val Ser His Glu Ala Val Trp Gln His Val Leu Glu His Ile Arg Arg
1 5 10 15

Ser Ile Thr Glu Val Glu Phe His Thr Trp Phe Glu Arg Ile Arg Pro
20 25 30

Leu Gly Ile Arg Asp Gly Val Leu Glu Leu Ala Val Pro Thr Ser Phe
35 40 45

Ala Leu Asp Trp Ile Arg Arg His Tyr Ala Gly Leu Ile Gln Glu Gly
50 55 60

Pro Arg Leu Leu Gly Ala Gln Ala Pro Arg Phe Glu Leu Arg Val Val
65 70 75 80

Pro Gly Val Val Val Gln Glu Asp Ile Phe Gln Pro Pro Pro Ser Pro
85 90 95

Pro Ala Gln Ala Gln Pro Glu Asp Thr Phe Lys Thr Ser Trp Trp Gly
100 105 110

Pro Thr Thr Pro Trp Pro His Gly Gly Ala Val Ala Val Ala Glu Ser
115 120 125

Pro Gly Arg Ala Tyr Asn Pro Leu Phe Ile Tyr Gly Gly Arg Gly Leu
130 135 140

Gly Lys Thr Tyr Leu Met His Ala Val Gly Pro Leu Arg Ala Lys Arg
145 150 155 160

Phe Pro His Met Arg Leu Glu Tyr Val Ser Thr Glu Thr Phe Thr Asn
165 170 175

Glu Leu Ile Asn Arg Pro Ser Ala Arg Asp Arg Met Thr Glu Phe Arg
180 185 190

Glu Arg Tyr Arg Ser Val Asp Leu Leu Leu Val Asp Asp Val Gln Phe

195

200

205

Ile Ala Gly Lys Glu Arg Thr Gln Glu Glu Phe Phe His Thr Phe Asn
 210 215 220

Ala Leu Tyr Glu Ala His Lys Gln Ile Ile Leu Ser Ser Asp Arg Pro
 225 230 235 240

Pro Lys Asp Ile Leu Thr Leu Glu Ala Arg Leu Arg Ser Arg Phe Glu
 245 250 255

Trp Gly Leu Ile Thr Asp Asn Pro Ala Pro Asp Leu Glu Thr Arg Ile
 260 265 270

Ala Ile Leu Lys Met Asn Ala Ser Ser Gly Pro Glu Asp Pro Glu Asp
 275 280 285

Ala Leu Glu Tyr Ile Ala Arg Gln Val Thr Ser Asn Ile Arg Glu Trp
 290 295 300

Glu Gly Ala Leu Met Arg Ala Ser Pro Phe Ala Ser Leu Asn Gly Val
 305 310 315 320

Glu Leu Thr Arg Ala Val Ala Ala Lys Ala Leu Arg His Leu Arg Pro
 325 330 335

Arg Glu Leu Glu Ala Asp Pro Leu Glu Ile Ile Arg Lys Ala Ala Gly
 340 345 350

Pro Val Arg Pro Glu Thr Pro Gly Gly Ala His Gly Glu Arg Arg Lys
 355 360 365

Lys Glu Val Val Leu Pro Arg Gln Leu Ala Met Tyr Leu Val Arg Glu
 370 375 380

Leu Thr Pro Ala Ser Leu Pro Glu Ile Asp Gln Leu Asn Asp Asp Arg
 385 390 395 400

Asp His Thr Thr Val Leu Tyr Ala Ile Gln Lys Val Gln Glu Leu Ala
 405 410 415

Glu Ser Asp Arg Glu Val Gln Gly Leu Leu Arg Thr Leu Arg Glu Ala
 420 425 430

Cys Thr

<210> 106
 <211> 1128
 <212> DNA
 <213> *Thermus thermophilus*

<400> 106
 atgaacataa cggttcccaa aaaactcctc tcggaccagc tttccctcct ggagcgcac 60
 gtcccctcta gaagcgccaa cccctctac acctacctgg ggctttacgc cgaggaaggg 120
 gccttgatcc tcttcgggac caacggggag gtggacctcg aggtccgcct ccccgccgag 180
 gccc aaagcc tccccgggt gctcgtcccc gccagccct tcttcagct ggtgcggagc 240
 cttcctgggg acctcgtggc cctcggcctc gcctcggagc cgggccaggg ggggcagctg 300
 gagctctcct ccgggcggtt ccgcaccccg ctcagcctgg cccctgccga gggctacccc 360
 gagcttctgg tgcccgaggg ggaggacaag ggggccttcc ccctccggac gcggatgccc 420
 tccggggagc tcgtcaaggc cttgacctac gtgcgctacg ccgcgagcaa cgaggagtac 480
 cgggccatct tccgcggggt gcagctggag ttctcccccc agggcttccg ggcgggtggc 540
 tccgacgggt accgcctcgc cctctacgac ctgcccctgc cccaagggtt ccaggccaag 600
 gccgtggtcc ccgcccggag cgtggacgag atggtgcggg tcctgaaggg ggcggacggg 660
 gccgaggccg tcctcgcctt gggcgagggg gtggtggccc tggccctcga gggcggaagc 720
 ggggtccgga tggccctccg cctcatggaa ggggagttcc ccgactacca gagggtcacc 780
 ccccaggagt tcgccctcaa ggtccaggtg gagggggagg ccctcaggga ggcgggtgcg 840
 cgggtgagcg tcctctccga ccggcagaac caccgggtgg acctcctttt ggaggaaggc 900
 cggatcctcc tctccgccga gggggactac ggcaaggggc aggaggaggt gcccgcccag 960
 gtggaggggc cggacatggc cgtggcctac aacgcccgt acctcctcga ggccctcgcc 1020
 cccgtggggg accgggcccc cctgggcatc tccgggcccc cgagcccag cctcatctgg 1080
 ggggacgggg aggggtaccg ggcgggtggtg gtgcccctca ggggtctag 1128

<210> 107
 <211> 376
 <212> PRT
 <213> *Thermus thermophilus*

<400> 107
 Met Asn Ile Thr Val Pro Lys Lys Leu Leu Ser Asp Gln Leu Ser Leu
 1 5 10 15
 Leu Glu Arg Ile Val Pro Ser Arg Ser Ala Asn Pro Leu Tyr Thr Tyr
 20 25 30
 Leu Gly Leu Tyr Ala Glu Glu Gly Ala Leu Ile Leu Phe Gly Thr Asn
 35 40 45
 Gly Glu Val Asp Leu Glu Val Arg Leu Pro Ala Glu Ala Gln Ser Leu
 50 55 60
 Pro Arg Val Leu Val Pro Ala Gln Pro Phe Phe Gln Leu Val Arg Ser
 65 70 75 80

Leu Pro Gly Asp Leu Val Ala Leu Gly Leu Ala Ser Glu Pro Gly Gln
 85 90 95
 Gly Gly Gln Leu Glu Leu Ser Ser Gly Arg Phe Arg Thr Arg Leu Ser
 100 105 110
 Leu Ala Pro Ala Glu Gly Tyr Pro Glu Leu Leu Val Pro Glu Gly Glu
 115 120 125
 Asp Lys Gly Ala Phe Pro Leu Arg Thr Arg Met Pro Ser Gly Glu Leu
 130 135 140
 Val Lys Ala Leu Thr His Val Arg Tyr Ala Ala Ser Asn Glu Glu Tyr
 145 150 155 160
 Arg Ala Ile Phe Arg Gly Val Gln Leu Glu Phe Ser Pro Gln Gly Phe
 165 170 175
 Arg Ala Val Ala Ser Asp Gly Tyr Arg Leu Ala Leu Tyr Asp Leu Pro
 180 185 190
 Leu Pro Gln Gly Phe Gln Ala Lys Ala Val Val Pro Ala Arg Ser Val
 195 200 205
 Asp Glu Met Val Arg Val Leu Lys Gly Ala Asp Gly Ala Glu Ala Val
 210 215 220
 Leu Ala Leu Gly Glu Gly Val Leu Ala Leu Ala Leu Glu Gly Gly Ser
 225 230 235 240
 Gly Val Arg Met Ala Leu Arg Leu Met Glu Gly Glu Phe Pro Asp Tyr
 245 250 255
 Gln Arg Val Ile Pro Gln Glu Phe Ala Leu Lys Val Gln Val Glu Gly
 260 265 270
 Glu Ala Leu Arg Glu Ala Val Arg Arg Val Ser Val Leu Ser Asp Arg
 275 280 285
 Gln Asn His Arg Val Asp Leu Leu Leu Glu Glu Gly Arg Ile Leu Leu
 290 295 300
 Ser Ala Glu Gly Asp Tyr Gly Lys Gly Gln Glu Glu Val Pro Ala Gln
 305 310 315 320
 Val Glu Gly Pro Asp Met Ala Val Ala Tyr Asn Ala Arg Tyr Leu Leu
 325 330 335

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Glu Ala Leu Ala Pro Val Gly Asp Arg Ala His Leu Gly Ile Ser Gly
 340 345 350

Pro Thr Ser Pro Ser Leu Ile Trp Gly Asp Gly Glu Gly Tyr Arg Ala
 355 360 365

Val Val Val Pro Leu Arg Val Glx
 370 375

<210> 108

<211> 376

<212> PRT

<213> *Thermus thermophilus*

<400> 108

Met Asn Ile Thr Val Pro Lys Lys Leu Leu Ser Asp Gln Leu Ser Leu
 1 5 10 15

Leu Glu Arg Ile Val Pro Ser Arg Ser Ala Asn Pro Leu Tyr Thr Tyr
 20 25 30

Leu Gly Leu Tyr Ala Glu Glu Gly Ala Leu Ile Leu Phe Gly Thr Asn
 35 40 45

Gly Glu Val Asp Leu Glu Val Arg Leu Pro Ala Glu Ala Gln Ser Leu
 50 55 60

Pro Arg Val Leu Val Pro Ala Gln Pro Phe Phe Gln Leu Val Arg Ser
 65 70 75 80

Leu Pro Gly Asp Leu Val Ala Leu Gly Leu Ala Ser Glu Pro Gly Gln
 85 90 95

Gly Gly Gln Leu Glu Leu Ser Ser Gly Arg Phe Arg Thr Arg Leu Ser
 100 105 110

Leu Ala Pro Ala Glu Gly Tyr Pro Glu Leu Leu Val Pro Glu Gly Glu
 115 120 125

Asp Lys Gly Ala Phe Pro Leu Arg Thr Arg Met Pro Ser Gly Glu Leu
 130 135 140

Val Lys Ala Leu Thr His Val Arg Tyr Ala Ala Ser Asn Glu Glu Tyr
 145 150 155 160

Arg Ala Ile Phe Arg Gly Val Gln Leu Glu Phe Ser Pro Gln Gly Phe
 165 170 175

Arg Ala Val Ala Ser Asp Gly Tyr Arg Leu Ala Leu Tyr Asp Leu Pro
 180 185 190
 Leu Pro Gln Gly Phe Gln Ala Lys Ala Val Val Pro Ala Arg Ser Val
 195 200 205
 Asp Glu Met Val Arg Val Leu Lys Gly Ala Asp Gly Ala Glu Ala Val
 210 215 220
 Leu Ala Leu Gly Glu Gly Val Leu Ala Leu Ala Leu Glu Gly Gly Ser
 225 230 235 240
 Gly Val Arg Met Ala Leu Arg Leu Met Glu Gly Glu Phe Pro Asp Tyr
 245 250 255
 Gln Arg Val Ile Pro Gln Glu Phe Ala Leu Lys Val Gln Val Glu Gly
 260 265 270
 Glu Ala Leu Arg Glu Ala Val Arg Arg Val Ser Val Leu Ser Asp Arg
 275 280 285
 Gln Asn His Arg Val Asp Leu Leu Leu Glu Glu Gly Arg Ile Leu Leu
 290 295 300
 Ser Ala Glu Gly Asp Tyr Gly Lys Gly Gln Glu Glu Val Pro Ala Gln
 305 310 315 320
 Val Glu Gly Pro Asp Met Ala Val Ala Tyr Asn Ala Arg Tyr Leu Leu
 325 330 335
 Glu Ala Leu Ala Pro Val Gly Asp Arg Ala His Leu Gly Ile Ser Gly
 340 345 350
 Pro Thr Ser Pro Ser Leu Ile Trp Gly Asp Gly Glu Gly Tyr Arg Ala
 355 360 365
 Val Val Val Pro Leu Arg Val Glx
 370 375

<210> 109

<211> 367

<212> PRT

<213> Escherichia coli

<400> 109

Met Lys Phe Thr Val Glu Arg Glu His Leu Leu Lys Pro Leu Gln Gln

1	5	10	15
Val Ser Gly Pro Leu Gly Gly Arg Pro Thr Leu Pro Ile Leu Gly Asn	20	25	30
Leu Leu Leu Gln Val Ala Asp Gly Thr Leu Ser Leu Thr Gly Thr Asp	35	40	45
Leu Glu Met Glu Met Val Ala Arg Val Ala Leu Val Gln Pro His Glu	50	55	60
Pro Gly Ala Thr Thr Val Pro Ala Arg Lys Phe Phe Asp Ile Cys Arg	65	70	75
Gly Leu Pro Glu Gly Ala Glu Ile Ala Val Gln Leu Glu Gly Glu Arg	85	90	95
Met Leu Val Arg Ser Gly Arg Ser Arg Phe Ser Leu Ser Thr Leu Pro	100	105	110
Ala Ala Asp Phe Pro Asn Leu Asp Asp Trp Gln Ser Glu Val Glu Phe	115	120	125
Thr Leu Pro Gln Ala Thr Met Lys Arg Leu Ile Glu Ala Thr Gln Phe	130	135	140
Ser Met Ala His Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Phe	145	150	155
Glu Thr Glu Gly Glu Glu Leu Arg Thr Val Ala Thr Asp Gly His Arg	165	170	175
Leu Ala Val Cys Ser Met Pro Ile Gly Gln Ser Leu Pro Ser His Ser	180	185	190
Val Ile Val Pro Arg Lys Gly Val Ile Glu Leu Met Arg Met Leu Asp	195	200	205
Gly Gly Asp Asn Pro Leu Arg Val Gln Ile Gly Ser Asn Asn Ile Arg	210	215	220
Ala His Val Gly Asp Phe Ile Phe Thr Ser Lys Leu Val Asp Gly Arg	225	230	235
Phe Pro Asp Tyr Arg Arg Val Leu Pro Lys Asn Pro Asp Lys His Leu	245	250	255
Glu Ala Gly Cys Asp Leu Leu Lys Gln Ala Phe Ala Arg Ala Ala Ile			

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260	265	270
Leu Ser Asn Glu Lys Phe Arg Gly Val Arg Leu Tyr Val Ser Glu Asn 275	280	285
Gln Leu Lys Ile Thr Ala Asn Asn Pro Glu Gln Glu Ala Glu Glu 290	295	300
Ile Leu Asp Val Thr Tyr Ser Gly Ala Glu Met Glu Ile Gly Phe Asn 305	310	315 320
Val Ser Tyr Val Leu Asp Val Leu Asn Ala Leu Lys Cys Glu Asn Val 325	330	335
Arg Met Met Leu Thr Asp Ser Val Ser Ser Val Gln Ile Glu Asp Ala 340	345	350
Ala Ser Gln Ser Ala Ala Tyr Val Val Met Pro Met Arg Leu Glx 355	360	365
<210> 110		
<211> 367		
<212> PRT		
<213> Proteus mirabilis		
<400> 110		
Met Lys Phe Ile Ile Glu Arg Glu Gln Leu Leu Lys Pro Leu Gln Gln 1	5	10 15
Val Ser Gly Pro Leu Gly Gly Arg Pro Thr Leu Pro Ile Leu Gly Asn 20	25	30
Leu Leu Leu Lys Val Thr Glu Asn Thr Leu Ser Leu Thr Gly Thr Asp 35	40	45
Leu Glu Met Glu Met Met Ala Arg Val Ser Leu Ser Gln Ser His Glu 50	55	60
Ile Gly Ala Thr Thr Val Pro Ala Arg Lys Phe Phe Asp Ile Trp Arg 65	70	75 80
Gly Leu Pro Glu Gly Ala Glu Ile Ser Val Glu Leu Asp Gly Asp Arg 85	90	95
Leu Leu Val Arg Ser Gly Arg Ser Arg Phe Ser Leu Ser Thr Leu Pro 100	105	110

Ala	Ser	Asp	Phe	Pro	Asn	Leu	Asp	Asp	Trp	Gln	Ser	Glu	Val	Glu	Phe	115	120	125	
Thr	Leu	Pro	Gln	Ala	Thr	Leu	Lys	Arg	Leu	Ile	Glu	Ser	Thr	Gln	Phe	130	135	140	
Ser	Met	Ala	His	Gln	Asp	Val	Arg	Tyr	Tyr	Leu	Asn	Gly	Met	Leu	Phe	145	150	155	160
Glu	Thr	Glu	Asn	Thr	Glu	Leu	Arg	Thr	Val	Ala	Thr	Asp	Gly	His	Arg	165	170	175	
Leu	Ala	Val	Cys	Ala	Met	Asp	Ile	Gly	Gln	Ser	Leu	Pro	Gly	His	Ser	180	185	190	
Val	Ile	Val	Pro	Arg	Lys	Gly	Val	Ile	Glu	Leu	Met	Arg	Leu	Leu	Asp	195	200	205	
Gly	Ser	Gly	Glu	Ser	Leu	Leu	Gln	Leu	Gln	Ile	Gly	Ser	Asn	Asn	Leu	210	215	220	
Arg	Ala	His	Val	Gly	Asp	Phe	Ile	Phe	Thr	Ser	Lys	Leu	Val	Asp	Gly	225	230	235	240
Arg	Phe	Pro	Asp	Tyr	Arg	Arg	Val	Leu	Pro	Lys	Asn	Pro	Thr	Lys	Thr	245	250	255	
Val	Ile	Ala	Gly	Cys	Asp	Ile	Leu	Lys	Gln	Ala	Phe	Ser	Arg	Ala	Ala	260	265	270	
Ile	Leu	Ser	Asn	Glu	Lys	Phe	Arg	Gly	Val	Arg	Ile	Asn	Leu	Thr	Asn	275	280	285	
Gly	Gln	Leu	Lys	Ile	Thr	Ala	Asn	Asn	Pro	Glu	Gln	Glu	Glu	Ala	Glu	290	295	300	
Glu	Ile	Val	Asp	Val	Gln	Tyr	Gln	Gly	Glu	Glu	Met	Glu	Ile	Gly	Phe	305	310	315	320
Asn	Val	Ser	Tyr	Leu	Leu	Asp	Val	Leu	Asn	Thr	Leu	Lys	Cys	Glu	Glu	325	330	335	
Val	Lys	Leu	Leu	Leu	Thr	Asp	Ala	Val	Ser	Ser	Val	Gln	Val	Glu	Asn	340	345	350	
Val	Ala	Ser	Ala	Ala	Ala	Ala	Tyr	Val	Val	Met	Pro	Met	Arg	Leu		355	360	365	

<210> 111
 <211> 366
 <212> PRT
 <213> Haemophilus influenzae

<400> 111

Met Gln Phe Ser Ile Ser Arg Glu Asn Leu Leu Lys Pro Leu Gln Gln
 1 5 10 15

Val Cys Gly Val Leu Ser Asn Arg Pro Asn Ile Pro Val Leu Asn Asn
 20 25 30

Val Leu Leu Gln Ile Glu Asp Tyr Arg Leu Thr Ile Thr Gly Thr Asp
 35 40 45

Leu Glu Val Glu Leu Ser Ser Gln Thr Gln Leu Ser Ser Ser Ser Glu
 50 55 60

Asn Gly Thr Phe Thr Ile Pro Ala Lys Lys Phe Leu Asp Ile Cys Arg
 65 70 75 80

Thr Leu Ser Asp Asp Ser Glu Ile Thr Val Thr Phe Glu Gln Asp Arg
 85 90 95

Ala Leu Val Gln Ser Gly Arg Ser Arg Phe Thr Leu Ala Thr Gln Pro
 100 105 110

Ala Glu Glu Tyr Pro Asn Leu Thr Asp Trp Gln Ser Glu Val Asp Phe
 115 120 125

Glu Leu Pro Gln Asn Thr Leu Arg Arg Leu Ile Glu Ala Thr Gln Phe
 130 135 140

Ser Met Ala Asn Gln Asp Ala Arg Tyr Phe Leu Asn Gly Met Lys Phe
 145 150 155 160

Glu Thr Glu Gly Asn Leu Leu Arg Thr Val Ala Thr Asp Gly His Arg
 165 170 175

Leu Ala Val Cys Thr Ile Ser Leu Glu Gln Glu Leu Gln Asn His Ser
 180 185 190

Val Ile Leu Pro Arg Lys Gly Val Leu Glu Leu Val Arg Leu Leu Glu
 195 200 205

Thr Asn Asp Glu Pro Ala Arg Leu Gln Ile Gly Thr Asn Asn Leu Arg
 210 215 220

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65		70		75		80
Ser Leu Pro Asn Asp Ala Leu Ile Asp Ile Lys Val Asp Glu Gln Lys						
	85		90		95	
Leu Leu Val Lys Ala Gly Arg Ser Arg Phe Thr Leu Ser Thr Leu Pro						
	100		105		110	
Ala Asn Asp Phe Pro Thr Val Glu Glu Gly Pro Gly Ser Leu Thr Cys						
	115		120		125	
Asn Leu Glu Gln Ser Lys Leu Arg Arg Leu Ile Glu Arg Thr Ser Phe						
	130		135		140	
Ala Met Ala Gln Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Leu						
	145		150		155	160
Glu Val Ser Arg Asn Thr Leu Arg Ala Val Ser Thr Asp Gly His Arg						
		165		170		175
Leu Ala Leu Cys Ser Met Ser Ala Pro Ile Glu Gln Glu Asp Arg His						
	180		185		190	
Gln Val Ile Val Pro Arg Lys Gly Ile Leu Glu Leu Ala Arg Leu Leu						
	195		200		205	
Thr Asp Pro Glu Gly Met Val Ser Ile Val Leu Gly Gln His His Ile						
	210		215		220	
Arg Ala Thr Thr Gly Glu Phe Thr Phe Thr Ser Lys Leu Val Asp Gly						
	225		230		235	240
Lys Phe Pro Asp Tyr Glu Arg Val Leu Pro Lys Gly Gly Asp Lys Leu						
	245		250		255	
Val Val Gly Asp Arg Gln Ala Leu Arg Glu Ala Phe Ser Arg Thr Ala						
	260		265		270	
Ile Leu Ser Asn Glu Lys Tyr Arg Gly Ile Arg Leu Gln Leu Ala Ala						
	275		280		285	
Gly Gln Leu Lys Ile Gln Ala Asn Asn Pro Glu Gln Glu Glu Ala Glu						
	290		295		300	
Glu Glu Ile Ser Val Asp Tyr Glu Gly Ser Ser Leu Glu Ile Gly Phe						
	305		310		315	320
Asn Val Ser Tyr Leu Leu Asp Val Leu Gly Val Met Thr Thr Glu Gln						

325

330

335

Val Arg Leu Ile Leu Ser Asp Ser Asn Ser Ser Ala Leu Leu Gln Glu
 340 345 350

Ala Gly Asn Asp Asp Ser Ser Tyr Val Val Met Pro Met Arg Leu
 355 360 365

<210> 113

<211> 366

<212> PRT

<213> Buchnera aphidicola

<400> 113

Met Lys Phe Thr Ile Gln Asn Asp Ile Leu Thr Lys Asn Leu Lys Lys
 1 5 10 15

Ile Thr Arg Val Leu Val Lys Asn Ile Ser Phe Pro Ile Leu Glu Asn
 20 25 30

Ile Leu Ile Gln Val Glu Asp Gly Thr Leu Ser Leu Thr Thr Thr Asn
 35 40 45

Leu Glu Ile Glu Leu Ile Ser Lys Ile Glu Ile Ile Thr Lys Tyr Ile
 50 55 60

Pro Gly Lys Thr Thr Ile Ser Gly Arg Lys Ile Leu Asn Ile Cys Arg
 65 70 75 80

Thr Leu Ser Glu Lys Ser Lys Ile Lys Met Gln Leu Lys Asn Lys Lys
 85 90 95

Met Tyr Ile Ser Ser Glu Asn Ser Asn Tyr Ile Leu Ser Thr Leu Ser
 100 105 110

Ala Asp Thr Phe Pro Asn His Gln Asn Phe Asp Tyr Ile Ser Lys Phe
 115 120 125

Asp Ile Ser Ser Asn Ile Leu Lys Glu Met Ile Glu Lys Thr Glu Phe
 130 135 140

Ser Met Gly Lys Gln Asp Val Arg Tyr Tyr Leu Asn Gly Met Leu Leu
 145 150 155 160

Glu Lys Lys Asp Lys Phe Leu Arg Ser Val Ala Thr Asp Gly Tyr Arg
 165 170 175

Leu Ala Ile Ser Tyr Thr Gln Leu Lys Lys Asp Ile Asn Phe Phe Ser
 180 185 190
 Ile Ile Ile Pro Asn Lys Ala Val Met Glu Leu Leu Lys Leu Leu Asn
 195 200 205
 Thr Gln Pro Gln Leu Leu Asn Ile Leu Ile Gly Ser Asn Ser Ile Arg
 210 215 220
 Ile Tyr Thr Lys Asn Leu Ile Phe Thr Thr Gln Leu Ile Glu Gly Glu
 225 230 235 240
 Tyr Pro Asp Tyr Lys Ser Val Leu Phe Lys Glu Lys Lys Asn Pro Ile
 245 250 255
 Ile Thr Asn Ser Ile Leu Leu Lys Lys Ser Leu Leu Arg Val Ala Ile
 260 265 270
 Leu Ala His Glu Lys Phe Cys Gly Ile Glu Ile Lys Ile Glu Asn Gly
 275 280 285
 Lys Phe Lys Val Leu Ser Asp Asn Gln Glu Glu Glu Thr Ala Glu Asp
 290 295 300
 Leu Phe Glu Ile Asp Tyr Phe Gly Glu Lys Ile Glu Ile Ser Ile Asn
 305 310 315 320
 Val Tyr Tyr Leu Leu Asp Val Ile Asn Asn Ile Lys Ser Glu Asn Ile
 325 330 335
 Ala Leu Phe Leu Asn Lys Ser Lys Ser Ser Ile Gln Ile Glu Ala Glu
 340 345 350
 Asn Asn Ser Ser Asn Ala Tyr Val Val Met Leu Leu Lys Arg
 355 360 365

<210> 114

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 114

gtgtggatcc tcgtccccct catgcgcgac caggaagg

39

<210> 115
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: primer

<400> 115
 gtgtggatcc gtggtgacct tagccac 27

<210> 116
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: primer

<400> 116
 ttcgtgtccg aggaccttgt ggtccacaac 30

<210> 117
 <211> 3514
 <212> DNA
 <213> Aquifex aeolicus

<400> 117
 atgagtaagg atttcgtcca ccttcacctg cacacccagt tctcactcct ggacggggct 60
 ataaagatag acgagctcgt gaaaaaggca aaggagtatg gatacaaagc tgtcggaatg 120
 tcagaccacg gaaacctctt cggttcgtat aaattctaca aagccctgaa ggcggaagga 180
 attaaagcca taatcggcat ggaagcctac tttaccacgg gttcgagggt tgacagaaag 240
 actaaaacga gcgaggacaa cataaccgac aagtacaacc accacctcat acttatagca 300
 aaggacgaaa aggtctaaag aacttaatga agctctcaac cctcgcctac aaagaagggt 360
 ttactacaa acccagaatt gattacgaac tccttgaaaa gtacggggag ggcctaatag 420
 cccttaccgc atgcctgaaa ggtgttccca cctactacgc ttctataaac gaagtgaaaa 480
 aggcggagga atgggtaaag aagttcaagg atatattcgg agatgacctt tatttagaac 540
 ttcaagcgaa caacattcca gaacaggaag tggcaaacag gaacttaata gagatagcca 600
 aaaagtacga tgtgaaactc atagcgacgc aggacgcca ctacctcaat cccgaagaca 660
 ggtacgcca cacggttctt atggcacttc aaatgaaaaa gaccattcac gaactgagtt 720
 cgggaaactt caagtgttca aacgaagacc ttcactttgc tccacccgag tacatgtgga 780
 aaaagtttga aggttaagttc gaaggctggg aaaaggcact cctgaacact ctcgaggtta 840
 tggaaaagac agcggacagc tttgagatat ttgaaaactc cacctacctc cttcccaagt 900
 acgacgttcc gcccgacaaa acccttgagg aatacctcag agaactcgcg tacaagggtt 960
 taagacagag gatagaaagg ggacaagcta aggatactaa agagtactgg gagaggctcg 1020

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agtacgaact ggaagttata aacaaaatgg gctttgcggg atacttcttg atagttcagg 1080
acttcataaa ctgggctaag aaaaacgaca tacctgttgg acccggaagg ggaagtgtg 1140
gaggttcctt cgtcgcatac gccatcgga taacggacgt tgaccctata aagcacggat 1200
tcctttttga gaggttctta aaccccgaaa gggtttccat gccggatata gacgtggatt 1260
tctgtcagga caacagggaa aaggatcatag agtacgtaag gaacaagtac ggacacgaca 1320
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tccttcagaa gtacggagaa cacagaacgg acatagagga caacgtaaag aagttcagac 1560
agatatgca agaaagtccg gagataaaac agctcgttga gacggccctg aagcttgaag 1620
gtctcacgag acacacctcc ctccacgccg cgggagtggg tatagacca aagcccttga 1680
gcgagctcgt tccctctac tacgataaag agggcgaaat cgcaaccag tacgacatgg 1740
ttcagctcga agaactcggg ctctgaaga tggacttcct cggactcaaa accctcacag 1800
aactgaaact catgaaagaa ctcataaagg aaagacacgg agtggatata aacttccttg 1860
aacttcccc tgcgacccg aaagtttaca aactccttca ggaaggaaaa accacgggag 1920
tggtccagct cgaaagcagg ggaatgaaag aactcctgaa gaaactaaag cccgacagct 1980
ttgacgacat cgttgcgggc ctgcactct acagaccgg acctctaaag agcggactcg 2040
ttgacacata cattaagaga aagcacggaa aagaaccgt tgagtacccc tccccggagc 2100
ttgaaccgt ccttaaggaa acctacggag taatcgttta tcaggaacag gtgatgaaga 2160
tgtctcagat actttccggc tttactcccg gagaggcgga taccctcaga aaggcgatag 2220
gtaagaagaa agcggattta atggctcaga tgaaagacaa gttcatacag ggagcgggtg 2280
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cctactcctt caacaagtct cactcggtag cttacgggta catctcctac tggaccgcct 2400
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agaggaaaga actactcgct aaagtggcaa actctgaaaa agcattaatg gctacacaaa 2820
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aggaagttct cggtttttac atttcagggc acccccttga caactacgaa aagctcctca 2940
agaaccgcta cacaccatt gaagatttag aagagtggga caaggaaagc gaagcgggtg 3000
ttacaggagt tatcacggaa ctcaaagtaa aaaagacgaa aaacggagat tacatggcgg 3060
tcttcaacct cgttgacaag acgggactaa tagagtgtgt cgtcttcccg ggagtttacg 3120
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aggaccttga aacggaaaat gtcaagttcg tggtgaaaga ggttttctcc cctgaggagt 3240
tcgcaaagga gatgaggaat accctttata tattcttaaa aagagagcaa gccctaaacg 3300
gcgttgccga aaaactaaag ggaattattg aaaacaacag gacggaggac ggatacaact 3360
tggttctcac ggttgatctg ggagactact tcgttgattt agcactccca caagatatga 3420
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<210> 118

<211> 1161

<212> PRT

<213> Aquifex aeolicus

<400> 118

Met	Ser	Lys	Asp	Phe	Val	His	Leu	His	Leu	His	Thr	Gln	Phe	Ser	Leu
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Leu	Asp	Gly	Ala	Ile	Lys	Ile	Asp	Glu	Leu	Val	Lys	Lys	Ala	Lys	Glu
			20					25					30		
Tyr	Gly	Tyr	Lys	Ala	Val	Gly	Met	Ser	Asp	His	Gly	Asn	Leu	Phe	Gly
	35						40					45			
Ser	Tyr	Lys	Phe	Tyr	Lys	Ala	Leu	Lys	Ala	Glu	Gly	Ile	Lys	Pro	Ile
	50					55					60				
Ile	Gly	Met	Glu	Ala	Tyr	Phe	Thr	Thr	Gly	Ser	Arg	Phe	Asp	Arg	Lys
65					70					75					80
Thr	Lys	Thr	Ser	Glu	Asp	Asn	Ile	Thr	Asp	Lys	Tyr	Asn	His	His	Leu
				85					90					95	
Ile	Leu	Ile	Ala	Lys	Asp	Asp	Lys	Gly	Leu	Lys	Asn	Leu	Met	Lys	Leu
			100					105					110		
Ser	Thr	Leu	Ala	Tyr	Lys	Glu	Gly	Phe	Tyr	Tyr	Lys	Pro	Arg	Ile	Asp
			115				120					125			
Tyr	Glu	Leu	Leu	Glu	Lys	Tyr	Gly	Glu	Gly	Leu	Ile	Ala	Leu	Thr	Ala
	130					135					140				
Cys	Leu	Lys	Gly	Val	Pro	Thr	Tyr	Tyr	Ala	Ser	Ile	Asn	Glu	Val	Lys
145					150					155					160
Lys	Ala	Glu	Glu	Trp	Val	Lys	Lys	Phe	Lys	Asp	Ile	Phe	Gly	Asp	Asp
				165					170					175	
Leu	Tyr	Leu	Glu	Leu	Gln	Ala	Asn	Asn	Ile	Pro	Glu	Gln	Glu	Val	Ala
			180					185					190		
Asn	Arg	Asn	Leu	Ile	Glu	Ile	Ala	Lys	Lys	Tyr	Asp	Val	Lys	Leu	Ile
			195				200					205			
Ala	Thr	Gln	Asp	Ala	His	Tyr	Leu	Asn	Pro	Glu	Asp	Arg	Tyr	Ala	His
	210					215					220				
Thr	Val	Leu	Met	Ala	Leu	Gln	Met	Lys	Lys	Thr	Ile	His	Glu	Leu	Ser
225					230					235					240
Ser	Gly	Asn	Phe	Lys	Cys	Ser	Asn	Glu	Asp	Leu	His	Phe	Ala	Pro	Pro

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245										250					255				
Glu	Tyr	Met	Trp	Lys	Lys	Phe	Glu	Gly	Lys	Phe	Glu	Gly	Trp	Glu	Lys				
			260						265					270					
Ala	Leu	Leu	Asn	Thr	Leu	Glu	Val	Met	Glu	Lys	Thr	Ala	Asp	Ser	Phe				
		275					280						285						
Glu	Ile	Phe	Glu	Asn	Ser	Thr	Tyr	Leu	Leu	Pro	Lys	Tyr	Asp	Val	Pro				
	290					295					300								
Pro	Asp	Lys	Thr	Leu	Glu	Glu	Tyr	Leu	Arg	Glu	Leu	Ala	Tyr	Lys	Gly				
305					310					315					320				
Leu	Arg	Gln	Arg	Ile	Glu	Arg	Gly	Gln	Ala	Lys	Asp	Thr	Lys	Glu	Tyr				
			325					330						335					
Trp	Glu	Arg	Leu	Glu	Tyr	Glu	Leu	Glu	Val	Ile	Asn	Lys	Met	Gly	Phe				
		340						345					350						
Ala	Gly	Tyr	Phe	Leu	Ile	Val	Gln	Asp	Phe	Ile	Asn	Trp	Ala	Lys	Lys				
	355						360					365							
Asn	Asp	Ile	Pro	Val	Gly	Pro	Gly	Arg	Gly	Ser	Ala	Gly	Gly	Ser	Leu				
	370					375					380								
Val	Ala	Tyr	Ala	Ile	Gly	Ile	Thr	Asp	Val	Asp	Pro	Ile	Lys	His	Gly				
385				390						395					400				
Phe	Leu	Phe	Glu	Arg	Phe	Leu	Asn	Pro	Glu	Arg	Val	Ser	Met	Pro	Asp				
			405						410					415					
Ile	Asp	Val	Asp	Phe	Cys	Gln	Asp	Asn	Arg	Glu	Lys	Val	Ile	Glu	Tyr				
		420						425					430						
Val	Arg	Asn	Lys	Tyr	Gly	His	Asp	Asn	Val	Ala	Gln	Ile	Ile	Thr	Tyr				
	435						440					445							
Asn	Val	Met	Lys	Ala	Lys	Gln	Thr	Leu	Arg	Asp	Val	Ala	Arg	Ala	Met				
	450					455					460								
Gly	Leu	Pro	Tyr	Ser	Thr	Ala	Asp	Lys	Leu	Ala	Lys	Leu	Ile	Pro	Gln				
465					470					475					480				
Gly	Asp	Val	Gln	Gly	Thr	Trp	Leu	Ser	Leu	Glu	Glu	Met	Tyr	Lys	Thr				
			485						490					495					
Pro	Val	Glu	Glu	Leu	Leu	Gln	Lys	Tyr	Gly	Glu	His	Arg	Thr	Asp	Ile				

500

505

510

Glu Asp Asn Val Lys Lys Phe Arg Gln Ile Cys Glu Glu Ser Pro Glu
515 520 525

Ile Lys Gln Leu Val Glu Thr Ala Leu Lys Leu Glu Gly Leu Thr Arg
530 535 540

His Thr Ser Leu His Ala Ala Gly Val Val Ile Ala Pro Lys Pro Leu
545 550 555 560

Ser Glu Leu Val Pro Leu Tyr Tyr Asp Lys Glu Gly Glu Val Ala Thr
565 570 575

Gln Tyr Asp Met Val Gln Leu Glu Glu Leu Gly Leu Leu Lys Met Asp
580 585 590

Phe Leu Gly Leu Lys Thr Leu Thr Glu Leu Lys Leu Met Lys Glu Leu
595 600 605

Ile Lys Glu Arg His Gly Val Asp Ile Asn Phe Leu Glu Leu Pro Leu
610 615 620

Asp Asp Pro Lys Val Tyr Lys Leu Leu Gln Glu Gly Lys Thr Thr Gly
625 630 635 640

Val Phe Gln Leu Glu Ser Arg Gly Met Lys Glu Leu Leu Lys Lys Leu
645 650 655

Lys Pro Asp Ser Phe Asp Asp Ile Val Ala Val Leu Ala Leu Tyr Arg
660 665 670

Pro Gly Pro Leu Lys Ser Gly Leu Val Asp Thr Tyr Ile Lys Arg Lys
675 680 685

His Gly Lys Glu Pro Val Glu Tyr Pro Phe Pro Glu Leu Glu Pro Val
690 695 700

Leu Lys Glu Thr Tyr Gly Val Ile Val Tyr Gln Glu Gln Val Met Lys
705 710 715 720

Met Ser Gln Ile Leu Ser Gly Phe Thr Pro Gly Glu Ala Asp Thr Leu
725 730 735

Arg Lys Ala Ile Gly Lys Lys Lys Ala Asp Leu Met Ala Gln Met Lys
740 745 750

Asp Lys Phe Ile Gln Gly Ala Val Glu Arg Gly Tyr Pro Glu Glu Lys

755

760

765

Ile Arg Lys Leu Trp Glu Asp Ile Glu Lys Phe Ala Ser Tyr Ser Phe
 770 775 780

Asn Lys Ser His Ser Val Ala Tyr Gly Tyr Ile Ser Tyr Trp Thr Ala
 785 790 795 800

Tyr Val Lys Ala His Tyr Pro Ala Glu Phe Phe Ala Val Lys Leu Thr
 805 810 815

Thr Glu Lys Asn Asp Asn Lys Phe Leu Asn Leu Ile Lys Asp Ala Lys
 820 825 830

Leu Phe Gly Phe Glu Ile Leu Pro Pro Asp Ile Asn Lys Ser Asp Val
 835 840 845

Gly Phe Thr Ile Glu Gly Glu Asn Arg Ile Arg Phe Gly Leu Ala Arg
 850 855 860

Ile Lys Gly Val Gly Glu Glu Thr Ala Lys Ile Ile Val Glu Ala Arg
 865 870 875 880

Lys Lys Tyr Lys Gln Phe Lys Gly Leu Ala Asp Phe Ile Asn Lys Thr
 885 890 895

Lys Asn Arg Lys Ile Asn Lys Lys Val Val Glu Ala Leu Val Lys Ala
 900 905 910

Gly Ala Phe Asp Phe Thr Lys Lys Lys Arg Lys Glu Leu Leu Ala Lys
 915 920 925

Val Ala Asn Ser Glu Lys Ala Leu Met Ala Thr Gln Asn Ser Leu Phe
 930 935 940

Gly Ala Pro Lys Glu Glu Val Glu Glu Leu Asp Pro Leu Lys Leu Glu
 945 950 955 960

Lys Glu Val Leu Gly Phe Tyr Ile Ser Gly His Pro Leu Asp Asn Tyr
 965 970 975

Glu Lys Leu Leu Lys Asn Arg Tyr Thr Pro Ile Glu Asp Leu Glu Glu
 980 985 990

Trp Asp Lys Glu Ser Glu Ala Val Leu Thr Gly Val Ile Thr Glu Leu
 995 1000 1005

Lys Val Lys Lys Thr Lys Asn Gly Asp Tyr Met Ala Val Phe Asn Leu

1010

1015

1020

Val Asp Lys Thr Gly Leu Ile Glu Cys Val Val Phe Pro Gly Val Tyr
 1025 1030 1035 1040

Glu Glu Ala Lys Glu Leu Ile Glu Glu Asp Arg Val Val Val Val Lys
 1045 1050 1055

Gly Phe Leu Asp Glu Asp Leu Glu Thr Glu Asn Val Lys Phe Val Val
 1060 1065 1070

Lys Glu Val Phe Ser Pro Glu Glu Phe Ala Lys Glu Met Arg Asn Thr
 1075 1080 1085

Leu Tyr Ile Phe Leu Lys Arg Glu Gln Ala Leu Asn Gly Val Ala Glu
 1090 1095 1100

Lys Leu Lys Gly Ile Ile Glu Asn Asn Arg Thr Glu Asp Gly Tyr Asn
 1105 1110 1115 1120

Leu Val Leu Thr Val Asp Leu Gly Asp Tyr Phe Val Asp Leu Ala Leu
 1125 1130 1135

Pro Gln Asp Met Lys Leu Lys Ala Asp Arg Lys Val Val Glu Glu Ile
 1140 1145 1150

Glu Lys Leu Gly Val Lys Val Ile Ile
 1155 1160

<210> 119

<211> 2408

<212> DNA

<213> Aquifex aeolicus

<400> 119

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 tacctctttg ccggaccgag ggggggttggg aagacgacta ttgcaagaat tctcgcaaaa 180
 gctttgaact gtaaaaatcc ctccaaaggt gagccctgcg gtgagtgcga aaactgcagg 240
 gagatagaca ggggtgtgtt ccctgactta attgaaatgg atgccgcctc aaacaggggt 300
 atagacgacg taagggcatt aaaagaagcg gtcaattaca aacctataaa aggaaagtac 360
 aagggtttaca taatagacga agctcacatg ctcacgaaag aagctttcaa cgctctctta 420
 aaaaccctcg aagagccccc tcccagaact gttttcgtcc tttgtaccac ggagtacgac 480
 aaaattcttc ccacgatact ctcaaggtgt cagaggataa tcttctcaaa ggtaagaaag 540
 gaaaaagtaa tagagtatct aaaaaagata tgtgaaaagg aagggattga gtgcgaagag 600
 ggagcccttg aggttctggc tcatgcctct gaagggtgca tgagggatgc agcctctctc 660
 ctggaccagg cgagcgttta cggggaaggc agggtaacaa aagaagtagt ggagaacttc 720


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ctcggaattc tcagtcagga aagcgtagg agttttctga aattgcttct gaactcagaa 780
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ttttgggaga tgtagaaga ggaagtgaga aacgcaattt tagtaaagag cctgaaaaat 900
cccgaagcgc tggttcagaa ctggcaggat tacgaagact tcaaagacta ccctctggaa 960
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ctcgcggcac agctatacag ggagtttaaa gaactattcc ctgaaaacgc tgtagagtac 1980
tttgtctctt actacgacta ttaccaacct gaagcctaca ttcccgaata agatttatac 2040
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tgagtaagct cctgaggaaa ctcgttgagc taggatatca gagaaatgac tttgccataa 2280
agagggctac cttctcggtt aggggagacg tgggtgagat agtcccttct cacacggaag 2340
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ctctgaac 2408

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<210> 120

<211> 473

<212> PRT

<213> Aquifex aeolicus

<400> 120

Met Asn Tyr Val Pro Phe Ala Arg Lys Tyr Arg Pro Lys Phe Phe Arg

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Glu Val Ile Gly Gln Glu Ala Pro Val Arg Ile Leu Lys Asn Ala Ile

20 25 30

Lys Asn Asp Arg Val Ala His Ala Tyr Leu Phe Ala Gly Pro Arg Gly

35 40 45

Val Gly Lys Thr Thr Ile Ala Arg Ile Leu Ala Lys Ala Leu Asn Cys

50 55 60

Lys Asn Pro Ser Lys Gly Glu Pro Cys Gly Glu Cys Glu Asn Cys Arg
 65 70 75 80
 Glu Ile Asp Arg Gly Val Phe Pro Asp Leu Ile Glu Met Asp Ala Ala
 85 90 95
 Ser Asn Arg Gly Ile Asp Asp Val Arg Ala Leu Lys Glu Ala Val Asn
 100 105 110
 Tyr Lys Pro Ile Lys Gly Lys Tyr Lys Val Tyr Ile Ile Asp Glu Ala
 115 120 125
 His Met Leu Thr Lys Glu Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu
 130 135 140
 Glu Pro Pro Pro Arg Thr Val Phe Val Leu Cys Thr Thr Glu Tyr Asp
 145 150 155 160
 Lys Ile Leu Pro Thr Ile Leu Ser Arg Cys Gln Arg Ile Ile Phe Ser
 165 170 175
 Lys Val Arg Lys Glu Lys Val Ile Glu Tyr Leu Lys Lys Ile Cys Glu
 180 185 190
 Lys Glu Gly Ile Glu Cys Glu Glu Gly Ala Leu Glu Val Leu Ala His
 195 200 205
 Ala Ser Glu Gly Cys Met Arg Asp Ala Ala Ser Leu Leu Asp Gln Ala
 210 215 220
 Ser Val Tyr Gly Glu Gly Arg Val Thr Lys Glu Val Val Glu Asn Phe
 225 230 235 240
 Leu Gly Ile Leu Ser Gln Glu Ser Val Arg Ser Phe Leu Lys Leu Leu
 245 250 255
 Leu Asn Ser Glu Val Asp Glu Ala Ile Lys Phe Leu Arg Glu Leu Ser
 260 265 270
 Glu Lys Gly Tyr Asn Leu Thr Lys Phe Trp Glu Met Leu Glu Glu Glu
 275 280 285
 Val Arg Asn Ala Ile Leu Val Lys Ser Leu Lys Asn Pro Glu Ser Val
 290 295 300
 Val Gln Asn Trp Gln Asp Tyr Glu Asp Phe Lys Asp Tyr Pro Leu Glu
 305 310 315 320

Ala Leu Leu Tyr Val Glu Asn Leu Ile Asn Arg Gly Lys Val Glu Ala
 325 330 335

Arg Thr Arg Glu Pro Leu Arg Ala Phe Glu Leu Ala Val Ile Lys Ser
 340 345 350

Leu Ile Val Lys Asp Ile Ile Pro Val Ser Gln Leu Gly Ser Val Val
 355 360 365

Lys Glu Thr Lys Lys Glu Glu Lys Lys Val Glu Val Lys Glu Glu Pro
 370 375 380

Lys Val Lys Glu Glu Lys Pro Lys Glu Gln Glu Glu Asp Arg Phe Gln
 385 390 395 400

Lys Val Leu Asn Ala Val Asp Gly Lys Ile Leu Lys Arg Ile Leu Glu
 405 410 415

Gly Ala Lys Arg Glu Glu Arg Asp Gly Lys Ile Val Leu Lys Ile Glu
 420 425 430

Ala Ser Tyr Leu Arg Thr Met Lys Lys Glu Phe Asp Ser Leu Lys Glu
 435 440 445

Thr Phe Pro Phe Leu Glu Phe Glu Pro Val Glu Asp Lys Lys Lys Pro
 450 455 460

Gln Lys Ser Ser Gly Thr Arg Leu Phe
 465 470

<210> 121

<211> 1090

<212> DNA

<213> Aquifex aeolicus

<400> 121

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 aacttaatcg taagggcaac ggacttgga aactaccttg tagtctccgt aaagggggag 180
 gttgaagagg aaggagaggt ttgcgtccac tctcaaaaac tctacgatat agtcaagaac 240
 ttaaattccg cttacgttta ccttcatacg gaaggtgaaa aactcgtcat aacgggagga 300
 aagagtacgt acaaacttcc gacagctccc gcggaggact ttcccgaatt tccagaaatc 360
 gtagaaggag gagaaacact ttcgggaaac cttctcggtta acggaataga aaaggtagag 420
 tacgccatag cgaaggaaga agcgaacata gcccttcagg gaatgtatct gagaggatac 480
 gaggacagaa ttcactttgt gttcggacgg tcacaggctt gcactttatg aacctctacg 540
 taaacattga aaagagtga gacgagtctt ttgcttactt ctccactccc gagtggaaac 600

tcgccgtag ctccctggaag gagaattccc ggactacatg agtgtcatcc ctgaggagtt 660
 ttccggcgaa gtcttggttg agacagagga agtcttaaag gttttaaaga ggttgaaggc 720
 ttttaagcgaa ggaaaagttt ttcccgtgaa gattacctta agcgaaaacc ttgccatctt 780
 tgagttcgcg gatccggagt tcggagaagc gagagaggaa attgaagtgg agtacacggg 840
 agagcccttt gagataggat tcaacggaaa taccttatgg aggcgcttga cgcctacgac 900
 agcgaaagag tgtggttcaa gttcacaacc cccgacacgg ccactttatt ggaggctgaa 960
 gattacgaaa aggaacctta caagtgcata ataatgccga tgagggtgta gccatgaaaa 1020
 aagctttaat ctttttattg agcttgagcc ttttaattcc tgcgttttagc gaagccaaac 1080
 ccaagtcttc 1090

<210> 122

<211> 363

<212> PRT

<213> Aquifex aeolicus

<400> 122

Met Arg Val Lys Val Asp Arg Glu Glu Leu Glu Glu Val Leu Lys Lys
 1 5 10 15

Ala Arg Glu Ser Thr Glu Lys Lys Ala Ala Leu Pro Ile Leu Ala Asn
 20 25 30

Phe Leu Leu Ser Ala Lys Glu Glu Asn Leu Ile Val Arg Ala Thr Asp
 35 40 45

Leu Glu Asn Tyr Leu Val Val Ser Val Lys Gly Glu Val Glu Glu Glu
 50 55 60

Gly Glu Val Cys Val His Ser Gln Lys Leu Tyr Asp Ile Val Lys Asn
 65 70 75 80

Leu Asn Ser Ala Tyr Val Tyr Leu His Thr Glu Gly Glu Lys Leu Val
 85 90 95

Ile Thr Gly Gly Lys Ser Thr Tyr Lys Leu Pro Thr Ala Pro Ala Glu
 100 105 110

Asp Phe Pro Glu Phe Pro Glu Ile Val Glu Gly Gly Glu Thr Leu Ser
 115 120 125

Gly Asn Leu Leu Val Asn Gly Ile Glu Lys Val Glu Tyr Ala Ile Ala
 130 135 140

Lys Glu Glu Ala Asn Ile Ala Leu Gln Gly Met Tyr Leu Arg Gly Tyr
 145 150 155 160

Glu Asp Arg Ile His Phe Val Gly Ser Asp Gly His Arg Leu Ala Leu

165

170

175

Tyr Glu Pro Leu Gly Glu Phe Ser Lys Glu Leu Leu Ile Pro Arg Lys
 180 185 190

Ser Leu Lys Val Leu Lys Lys Leu Ile Thr Gly Ile Glu Asp Val Asn
 195 200 205

Ile Glu Lys Ser Glu Asp Glu Ser Phe Ala Tyr Phe Ser Thr Pro Glu
 210 215 220

Trp Lys Leu Ala Val Arg Leu Leu Glu Gly Glu Phe Pro Asp Tyr Met
 225 230 235 240

Ser Val Ile Pro Glu Glu Phe Ser Ala Glu Val Leu Phe Glu Thr Glu
 245 250 255

Glu Val Leu Lys Val Leu Lys Arg Leu Lys Ala Leu Ser Glu Gly Lys
 260 265 270

Val Phe Pro Val Lys Ile Thr Leu Ser Glu Asn Leu Ala Ile Phe Glu
 275 280 285

Phe Ala Asp Pro Glu Phe Gly Glu Ala Arg Glu Glu Ile Glu Val Glu
 290 295 300

Tyr Thr Gly Glu Pro Phe Glu Ile Gly Phe Asn Gly Lys Tyr Leu Met
 305 310 315 320

Glu Ala Leu Asp Ala Tyr Asp Ser Glu Arg Val Trp Phe Lys Phe Thr
 325 330 335

Thr Pro Asp Thr Ala Thr Leu Leu Glu Ala Glu Asp Tyr Glu Lys Glu
 340 345 350

Pro Tyr Lys Cys Ile Ile Met Pro Met Arg Val
 355 360

<210> 123

<211> 1093

<212> DNA

<213> Aquifex aeolicus

<400> 123

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 gaaaagtacg gggagaatta caccggttctg tgggggggatg agataagcga ggaggaattc 180

tacactgccc tttccgagac cagtatatc ggcggttcaa aggaaaaagc ggtgggtcatt 240
tacaacttcg gggatttcct gaagaagctc ggaaggaaga aaaaggaaaa agaaaggctt 300
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gtagcaaaca ggctgagcaa ggagaggata aaacagctcg tccttaagaa gttcaaagaa 480
aaagggataa acgtagaaaa cgatgccctt gaataccttc tccagctcac gggttacaac 540
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ttaacactcg atgaggtaaa gagagtagcc ttctcagtct cagaaaacgt aaacgtattt 660
gagttcgttg atttactcct cttaaaagat tacgaaaagg ctcttaaagt tttggactcc 720
ctcatttcct tcggaatata cccctccag attatgaaaa tcctgtcctc ctatgtctta 780
aaactttaca ccctcaagag gcttgaagag aaggagagg acctgaataa ggcgatggaa 840
agcgtgggaa taaagaacaa ctttctcaag atgaagttca aatcttactt aaaggcaaac 900
tctaaagagg acttgaagaa cctaactctc tccctccaga ggatagacgc tttttctaaa 960
ctttactttc aggacacagt gcagttgctg gggatttctt gacctcaaga ctggagaggg 1020
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ttttcccggt tct 1093

<210> 124
<211> 350
<212> PRT
<213> Aquifex aeolicus

<400> 124
Val Glu Thr Thr Ile Phe Gln Phe Gln Lys Thr Phe Phe Thr Lys Pro
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Pro Lys Glu Arg Val Phe Val Leu His Gly Glu Glu Gln Tyr Leu Ile
20 25 30
Arg Thr Phe Leu Ser Lys Leu Lys Glu Lys Tyr Gly Glu Asn Tyr Thr
35 40 45
Val Leu Trp Gly Asp Glu Ile Ser Glu Glu Glu Phe Tyr Thr Ala Leu
50 55 60
Ser Glu Thr Ser Ile Phe Gly Gly Ser Lys Glu Lys Ala Val Val Ile
65 70 75 80
Tyr Asn Phe Gly Asp Phe Leu Lys Lys Leu Gly Arg Lys Lys Lys Glu
85 90 95
Lys Glu Arg Leu Ile Lys Val Leu Arg Asn Val Lys Ser Asn Tyr Val
100 105 110
Phe Ile Val Tyr Asp Ala Lys Leu Gln Lys Gln Glu Leu Ser Ser Glu
115 120 125

Pro Leu Lys Ser Val Ala Ser Phe Gly Gly Ile Val Val Ala Asn Arg
 130 135 140
 Leu Ser Lys Glu Arg Ile Lys Gln Leu Val Leu Lys Lys Phe Lys Glu
 145 150 155 160
 Lys Gly Ile Asn Val Glu Asn Asp Ala Leu Glu Tyr Leu Leu Gln Leu
 165 170 175
 Thr Gly Tyr Asn Leu Met Glu Leu Lys Leu Glu Val Glu Lys Leu Ile
 180 185 190
 Asp Tyr Ala Ser Glu Lys Lys Ile Leu Thr Leu Asp Glu Val Lys Arg
 195 200 205
 Val Ala Phe Ser Val Ser Glu Asn Val Asn Val Phe Glu Phe Val Asp
 210 215 220
 Leu Leu Leu Leu Lys Asp Tyr Glu Lys Ala Leu Lys Val Leu Asp Ser
 225 230 235 240
 Leu Ile Ser Phe Gly Ile His Pro Leu Gln Ile Met Lys Ile Leu Ser
 245 250 255
 Ser Tyr Ala Leu Lys Leu Tyr Thr Leu Lys Arg Leu Glu Glu Lys Gly
 260 265 270
 Glu Asp Leu Asn Lys Ala Met Glu Ser Val Gly Ile Lys Asn Asn Phe
 275 280 285
 Leu Lys Met Lys Phe Lys Ser Tyr Leu Lys Ala Asn Ser Lys Glu Asp
 290 295 300
 Leu Lys Asn Leu Ile Leu Ser Leu Gln Arg Ile Asp Ala Phe Ser Lys
 305 310 315 320
 Leu Tyr Phe Gln Asp Thr Val Gln Leu Leu Arg Asp Phe Leu Thr Ser
 325 330 335
 Arg Leu Glu Arg Glu Val Val Lys Asn Thr Ser His Gly Gly
 340 345 350

<210> 125

<211> 1051

<212> DNA

<213> Aquifex aeolicus

<400> 125
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ttatgtaagg aaaacgtacc tggggatgcg gaagttgtcc ctcctgcaaa cagctaaacg 180
agctggagga agccttcttt aaaggagaaa tagaagactt taaagtttat aagacaagga 240
cggtaaaaag cacttcgttt accttatggg cgaacatccc gactttgttg taataatccc 300
gagcggacat tacataaaga tagaacagat aagggaagtt aagaactttg cctatgtgaa 360
gcccgcacta agcaggagaa aagtaattat aatagacgac gccacgcga tgacctctca 420
ggcggcaaac gctcttttaa aggtatttga agagccacct gcggacacca cctttatctt 480
gaccacgaac aggcgttctg caatcctgcc gactatcctc tccagaactt ttcaagtgga 540
gttcaagggc ttttcagtaa aagaggttat ggaaatagcg aaagtagacg aggaaatagc 600
gaaactctct ggaggcagtc taaaaagggc tatcttacta aaggaaaaca aagatatcct 660
aaacaaaagta aaggaattct tggaaaacga gccgttaaaa gtttacaagc ttgcaagtga 720
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cgttcaggcg gattaataaa ccgttattga ttccgtaaca tttaaaccctt aatctaaatt 960
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ggaagatagg aaccgtgagc ggtgtaaaag t 1051

<210> 126
<211> 305
<212> PRT
<213> Aquifex aeolicus

<400> 126
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Gly Gly Leu Leu Phe Tyr Gly Lys Glu Gly Ser Gly Lys Thr Lys Thr
20 25 30
Ala Phe Glu Phe Ala Lys Gly Ile Leu Cys Lys Glu Asn Val Pro Trp
35 40 45
Gly Cys Gly Ser Cys Pro Ser Cys Lys His Val Asn Glu Leu Glu Glu
50 55 60
Ala Phe Phe Lys Gly Glu Ile Glu Asp Phe Lys Val Tyr Lys Asp Lys
65 70 75 80
Asp Gly Lys Lys His Phe Val Tyr Leu Met Gly Glu His Pro Asp Phe
85 90 95
Val Val Ile Ile Pro Ser Gly His Tyr Ile Lys Ile Glu Gln Ile Arg
100 105 110

Glu Val Lys Asn Phe Ala Tyr Val Lys Pro Ala Leu Ser Arg Arg Lys
 115 120 125
 Val Ile Ile Ile Asp Asp Ala His Ala Met Thr Ser Gln Ala Ala Asn
 130 135 140
 Ala Leu Leu Lys Val Leu Glu Glu Pro Pro Ala Asp Thr Thr Phe Ile
 145 150 155 160
 Leu Thr Thr Asn Arg Arg Ser Ala Ile Leu Pro Thr Ile Leu Ser Arg
 165 170 175
 Thr Phe Gln Val Glu Phe Lys Gly Phe Ser Val Lys Glu Val Met Glu
 180 185 190
 Ile Ala Lys Val Asp Glu Glu Ile Ala Lys Leu Ser Gly Gly Ser Leu
 195 200 205
 Lys Arg Ala Ile Leu Leu Lys Glu Asn Lys Asp Ile Leu Asn Lys Val
 210 215 220
 Lys Glu Phe Leu Glu Asn Glu Pro Leu Lys Val Tyr Lys Leu Ala Ser
 225 230 235 240
 Glu Phe Glu Lys Trp Glu Pro Glu Lys Gln Lys Leu Phe Leu Glu Ile
 245 250 255
 Met Glu Glu Leu Val Ser Gln Lys Leu Thr Glu Glu Lys Lys Asp Asn
 260 265 270
 Tyr Thr Tyr Leu Leu Asp Thr Ile Arg Leu Phe Lys Asp Gly Leu Ala
 275 280 285
 Arg Gly Val Asn Glu Pro Leu Trp Leu Phe Thr Leu Ala Val Gln Ala
 290 295 300

Asp
 305

<210> 127
 <211> 630
 <212> DNA
 <213> Aquifex aeolicus

<400> 127
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 gagttctacg aagaaatcga tttgaaccag aagggtgaaag atgcaagggt tgtagttttt 120

gactgcgaag ccacagaact cgacgtaaag aaggcaaaac tcctttcaat aggtgcggtt 180
 gaggttaaaa acctggaaat agacctctct aaatcttttt acgagatact caaaagtgac 240
 gagataaagg cggcggagat acatggaata accagggaag acgttgaaaa gtacggaaaag 300
 gaaccaaagg aagtaatata cgactttctg aagtacataa agggaagcgt tctcgttggc 360
 tactacgtga agtttgacgt ctcaactcgtt gagaagtact ccataaagta cttccagtat 420
 ccaatcatca actacaagtt agacctgttt agtttcgtga agagagagta ccagagtggc 480
 aggagtcttg acgaccttat gaaggaactc ggtgtagaaa taagggcaag gcacaacgcc 540
 cttgaagatg cctacataac cgctcttctt ttcctaaagt acgtttaccc gaacagggag 600
 tacagactaa aggatctccc gattttcctt 630

<210> 128

<211> 210

<212> PRT

<213> Aquifex aeolicus

<400> 128

Met Asn Phe Leu Lys Lys Phe Leu Leu Leu Arg Lys Ala Gln Lys Ser
 1 5 10 15

Pro Tyr Phe Glu Glu Phe Tyr Glu Glu Ile Asp Leu Asn Gln Lys Val
 20 25 30

Lys Asp Ala Arg Phe Val Val Phe Asp Cys Glu Ala Thr Glu Leu Asp
 35 40 45

Val Lys Lys Ala Lys Leu Leu Ser Ile Gly Ala Val Glu Val Lys Asn
 50 55 60

Leu Glu Ile Asp Leu Ser Lys Ser Phe Tyr Glu Ile Leu Lys Ser Asp
 65 70 75 80

Glu Ile Lys Ala Ala Glu Ile His Gly Ile Thr Arg Glu Asp Val Glu
 85 90 95

Lys Tyr Gly Lys Glu Pro Lys Glu Val Ile Tyr Asp Phe Leu Lys Tyr
 100 105 110

Ile Lys Gly Ser Val Leu Val Gly Tyr Tyr Val Lys Phe Asp Val Ser
 115 120 125

Leu Val Glu Lys Tyr Ser Ile Lys Tyr Phe Gln Tyr Pro Ile Ile Asn
 130 135 140

Tyr Lys Leu Asp Leu Phe Ser Phe Val Lys Arg Glu Tyr Gln Ser Gly
 145 150 155 160

Arg Ser Leu Asp Asp Leu Met Lys Glu Leu Gly Val Glu Ile Arg Ala

165

170

175

Arg His Asn Ala Leu Glu Asp Ala Tyr Ile Thr Ala Leu Leu Phe Leu
 180 185 190

Lys Tyr Val Tyr Pro Asn Arg Glu Tyr Arg Leu Lys Asp Leu Pro Ile
 195 200 205

Phe Leu
 210

<210> 129

<211> 526

<212> DNA

<213> Aquifex aeolicus

<400> 129

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 aacggtgaat ttcaggagga aagtcacttc tttgacgtaa aggcgtacgg aaaaatggct 180
 gaagactggg ctacacgctt ctcgaaagga tacctcgtag tcgtagaggg aagactctcc 240
 caggaaaagt gggagaaaga aggaaagaag ttctcaaagg tcaggataat agcggaaaac 300
 gtaagattaa taaacaggcc gaaagggtgct gaacttcaag cagaagaaga ggaggaagtt 360
 cctcccattg aggaggaaat tgaaaaactc ggtaaagagg aagagaagcc ttttaccgat 420
 gaagaggacg aaataccttt ttaattttga ggagggttaa gtatggtagt gagagctcct 480
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<210> 130

<211> 147

<212> PRT

<213> Aquifex aeolicus

<400> 130

Met Leu Asn Lys Val Phe Ile Ile Gly Arg Leu Thr Gly Asp Pro Val
 1 5 10 15

Ile Thr Tyr Leu Pro Ser Gly Thr Pro Val Val Glu Phe Thr Leu Ala
 20 25 30

Tyr Asn Arg Arg Tyr Lys Asn Gln Asn Gly Glu Phe Gln Glu Glu Ser
 35 40 45

His Phe Phe Asp Val Lys Ala Tyr Gly Lys Met Ala Glu Asp Trp Ala
 50 55 60

Thr Arg Phe Ser Lys Gly Tyr Leu Val Leu Val Glu Gly Arg Leu Ser

65

70

75

80

Gln Glu Lys Trp Glu Lys Glu Gly Lys Lys Phe Ser Lys Val Arg Ile
85 90 95

Ile Ala Glu Asn Val Arg Leu Ile Asn Arg Pro Lys Gly Ala Glu Leu
100 105 110

Gln Ala Glu Glu Glu Glu Glu Val Pro Pro Ile Glu Glu Glu Ile Glu
115 120 125

Lys Leu Gly Lys Glu Glu Glu Lys Pro Phe Thr Asp Glu Glu Asp Glu
130 135 140

Ile Pro Phe
145

<210> 131

<211> 1472

<212> DNA

<213> Aquifex aeolicus

<400> 131

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aataagctcg	atttcgtatt	aataaaggat	caccttgaaa	agaaaaactt	actccagaaa	240
atacctatag	actggctcga	agaactctac	gaggaggcgg	tatcccctga	cacgcttgag	300
gaagtctgca	aaatagtaaa	acaacgttcc	gcacagaggg	cgataattca	actcggtata	360
gaactcattc	acaaaggaaa	ggaaaacaaa	gactttcaca	cattaatcga	ggaagcccag	420
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gttcggaag	aagttataga	actcatttat	aaattcaaaa	gctctgacag	gctagtcacg	540
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gaacagctcg	ttatgagact	cctctctatg	atgtcggagg	tcccactttt	caagataagg	780
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ccaaatcccg	aagagcaggg	tatagcggaa	gtgataatag	ccaagcaaa	gcaaggaccc	1260
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gaaggattcg	aagatattga	cttctgaaaa	ttaagggtttt	ataatttttat	cttggtctatc	1440

06-71987-1

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1472

<210> 132

<211> 438

<212> PRT

<213> Aquifex aeolicus

<400> 132

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Glu Tyr Leu Lys Glu Glu Asp Phe Cys Ile Asp Glu His Lys Leu Leu
35 40 45

Phe Arg Val Leu Thr Asn Leu Trp Ser Glu Tyr Gly Asn Lys Leu Asp
50 55 60

Phe Val Leu Ile Lys Asp His Leu Glu Lys Lys Asn Leu Leu Gln Lys
65 70 75 80

Ile Pro Ile Asp Trp Leu Glu Glu Leu Tyr Glu Glu Ala Val Ser Pro
85 90 95

Asp Thr Leu Glu Glu Val Cys Lys Ile Val Lys Gln Arg Ser Ala Gln
100 105 110

Arg Ala Ile Ile Gln Leu Gly Ile Thr Ser Thr Gln Phe Tyr His Val
115 120 125

Lys Asp Val Ala Glu Glu Val Ile Glu Leu Ile Tyr Lys Phe Lys Ser
130 135 140

Ser Asp Arg Leu Val Thr Gly Leu Pro Ser Gly Phe Thr Glu Leu Asp
145 150 155 160

Leu Lys Thr Thr Gly Phe His Pro Gly Asp Leu Ile Ile Leu Ala Ala
165 170 175

Arg Pro Gly Met Gly Lys Thr Ala Phe Met Leu Ser Ile Ile Tyr Asn
180 185 190

Leu Ala Lys Asp Glu Gly Lys Pro Ser Ala Val Phe Ser Leu Glu Met
195 200 205

Ser Lys Glu Gln Leu Val Met Arg Leu Leu Ser Met Met Ser Glu Val
 210 215 220
 Pro Leu Phe Lys Ile Arg Ser Gly Ser Ile Ser Asn Glu Asp Leu Lys
 225 230 235 240
 Lys Leu Glu Ala Ser Ala Ile Glu Leu Ala Lys Tyr Asp Ile Tyr Leu
 245 250 255
 Asp Asp Thr Pro Ala Leu Thr Thr Thr Asp Leu Arg Ile Arg Ala Arg
 260 265 270
 Lys Leu Arg Lys Glu Lys Glu Val Glu Phe Val Ala Val Asp Tyr Leu
 275 280 285
 Gln Leu Leu Arg Pro Pro Val Arg Lys Ser Ser Arg Gln Glu Glu Val
 290 295 300
 Ala Glu Val Ser Arg Asn Leu Lys Ala Leu Ala Lys Glu Leu His Ile
 305 310 315 320
 Pro Val Met Ala Leu Ala Gln Leu Ser Arg Glu Val Glu Lys Arg Ser
 325 330 335
 Asp Lys Arg Pro Gln Leu Ala Asp Leu Arg Glu Ser Gly Gln Ile Glu
 340 345 350
 Gln Asp Ala Asp Leu Ile Leu Phe Leu His Arg Pro Glu Tyr Tyr Lys
 355 360 365
 Lys Lys Pro Asn Pro Glu Glu Gln Gly Ile Ala Glu Val Ile Ile Ala
 370 375 380
 Lys Gln Arg Gln Gly Pro Thr Asp Ile Val Lys Leu Ala Phe Ile Lys
 385 390 395 400
 Glu Tyr Thr Lys Phe Ala Asn Leu Glu Ala Leu Pro Glu Gln Pro Pro
 405 410 415
 Glu Glu Glu Glu Leu Ser Glu Ile Ile Glu Thr Gln Glu Asp Glu Gly
 420 425 430
 Phe Glu Asp Ile Asp Phe
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<210> 133

<211> 1526

<212> DNA

<213> Aquifex aeolicus

<400> 133

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gtaggggggag acgcgataaa gttcgtttcc ctttacgagg acatctccta ttttgaagcc 240
gcccttgaac tcgcaaaacg ctacggaaag aaattagacc ttgaaaagat atcaaaagac 300
gaaaagggtat acgtggctct tgacagggtt tgtgatttct acagggaag ctttctcaaa 360
aacagagagg caagtgahta cgtaaagagt aggggaatag accctaaagt agcgaggaag 420
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cttttagagg cttaccttga aactaaaaac ctcttttctc ctacgaaggg tgtttacagg 540
gatctctttc ttcggcgtgt cgtgatcccg ataaaggatc cgaggggaag agttataggt 600
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gaagaaggat ttgcgatact tgtggaaggg tactttgacc ttttgagact tttttccgag 780
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actttaataa attttttagag ttagga 1526
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<210> 134

<211> 498

<212> PRT

<213> Aquifex aeolicus

<400> 134

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Val Ile Ser Glu Tyr Leu Asn Leu Glu Lys Val Gly Ser Asn Tyr Arg
      20                   25                   30
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Thr Asn Cys Pro Phe His Pro Asp Asp Thr Pro Ser Phe Tyr Val Ser
      35                   40                   45
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Pro Ser Lys Gln Ile Phe Lys Cys Phe Gly Cys Gly Val Gly Gly Asp
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50		55		60
Ala Ile Lys Phe Val Ser Leu Tyr Glu Asp Ile Ser Tyr Phe Glu Ala				
65		70		75
Ala Leu Glu Leu Ala Lys Arg Tyr Gly Lys Lys Leu Asp Leu Glu Lys				
	85		90	95
Ile Ser Lys Asp Glu Lys Val Tyr Val Ala Leu Asp Arg Val Cys Asp				
	100		105	110
Phe Tyr Arg Glu Ser Leu Leu Lys Asn Arg Glu Ala Ser Glu Tyr Val				
	115		120	125
Lys Ser Arg Gly Ile Asp Pro Lys Val Ala Arg Lys Phe Asp Leu Gly				
	130		135	140
Tyr Ala Pro Ser Ser Glu Ala Leu Val Lys Val Leu Lys Glu Asn Asp				
	145		150	155
Leu Leu Glu Ala Tyr Leu Glu Thr Lys Asn Leu Leu Ser Pro Thr Lys				
	165		170	175
Gly Val Tyr Arg Asp Leu Phe Leu Arg Arg Val Val Ile Pro Ile Lys				
	180		185	190
Asp Pro Arg Gly Arg Val Ile Gly Phe Gly Gly Arg Arg Ile Val Glu				
	195		200	205
Asp Lys Ser Pro Lys Tyr Ile Asn Ser Pro Asp Ser Arg Val Phe Lys				
	210		215	220
Lys Gly Glu Asn Leu Phe Gly Leu Tyr Glu Ala Lys Glu Tyr Ile Lys				
	225		230	235
Glu Glu Gly Phe Ala Ile Leu Val Glu Gly Tyr Phe Asp Leu Leu Arg				
	245		250	255
Leu Phe Ser Glu Gly Ile Arg Asn Val Val Ala Pro Leu Gly Thr Ala				
	260		265	270
Leu Thr Gln Asn Gln Ala Asn Leu Leu Ser Lys Phe Thr Lys Lys Val				
	275		280	285
Tyr Ile Leu Tyr Asp Gly Asp Asp Ala Gly Arg Lys Ala Met Lys Ser				
	290		295	300
Ala Ile Pro Leu Leu Leu Ser Ala Gly Val Glu Val Tyr Pro Val Tyr				

305 310 315 320
 Leu Pro Glu Gly Tyr Asp Pro Asp Glu Phe Ile Lys Glu Phe Gly Lys
 325 330 335
 Glu Glu Leu Arg Arg Leu Ile Asn Ser Ser Gly Glu Leu Phe Glu Thr
 340 345 350
 Leu Ile Lys Thr Ala Arg Glu Asn Leu Glu Glu Lys Thr Arg Glu Phe
 355 360 365
 Arg Tyr Tyr Leu Gly Phe Ile Ser Asp Gly Val Arg Arg Phe Ala Leu
 370 375 380
 Ala Ser Glu Phe His Thr Lys Tyr Lys Val Pro Met Glu Ile Leu Leu
 385 390 395 400
 Met Lys Ile Glu Lys Asn Ser Gln Glu Lys Glu Ile Lys Leu Ser Phe
 405 410 415
 Lys Glu Lys Ile Phe Leu Lys Gly Leu Ile Glu Leu Lys Pro Lys Ile
 420 425 430
 Asp Leu Glu Val Leu Asn Leu Ser Pro Glu Leu Lys Glu Leu Ala Val
 435 440 445
 Asn Ala Leu Asn Gly Glu Glu His Leu Leu Pro Lys Glu Val Leu Glu
 450 455 460
 Tyr Gln Val Asp Asn Leu Glu Lys Leu Phe Asn Asn Ile Leu Arg Asp
 465 470 475 480
 Leu Gln Lys Ser Gly Lys Lys Arg Lys Lys Arg Gly Leu Lys Asn Val
 485 490 495
 Asn Thr

<210> 135

<211> 705

<212> DNA

<213> Aquifex aeolicus

<400> 135

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 atcccaaaga ggtactggaa cgccaactta gacacttacc accccaagaa cgtatcccag 180

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<210> 136

<211> 235

<212> PRT

<213> Aquifex aeolicus

<400> 136

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			20					25					30		
Arg	Asp	Val	Asn	Arg	Glu	Leu	Asn	Ile	Pro	Lys	Arg	Tyr	Trp	Asn	Ala
		35					40					45			
Asn	Leu	Asp	Thr	Tyr	His	Pro	Lys	Asn	Val	Ser	Gln	Asn	Arg	Ala	Leu
	50					55					60				
Leu	Thr	Ile	Arg	Val	Phe	Val	His	Asn	Phe	Asn	Pro	Glu	Glu	Gly	Lys
65					70				75						80
Gly	Leu	Thr	Phe	Val	Gly	Ser	Pro	Gly	Val	Gly	Lys	Thr	His	Leu	Ala
				85					90					95	
Val	Ala	Thr	Leu	Lys	Ala	Ile	Tyr	Glu	Lys	Lys	Gly	Ile	Arg	Gly	Tyr
			100					105					110		
Phe	Phe	Asp	Thr	Lys	Asp	Leu	Ile	Phe	Arg	Leu	Lys	His	Leu	Met	Asp
		115					120					125			
Glu	Gly	Lys	Asp	Thr	Lys	Phe	Leu	Lys	Thr	Val	Leu	Asn	Ser	Pro	Val
	130					135					140				
Leu	Val	Leu	Asp	Asp	Leu	Gly	Ser	Glu	Arg	Leu	Ser	Asp	Trp	Gln	Arg
145					150					155					160
Glu	Leu	Ile	Ser	Tyr	Ile	Ile	Thr	Tyr	Arg	Tyr	Asn	Asn	Leu	Lys	Ser

165

170

175

Thr Ile Ile Thr Thr Asn Tyr Ser Leu Gln Arg Glu Glu Glu Ser Ser
180 185 190

Val Arg Ile Ser Ala Asp Leu Ala Ser Arg Leu Gly Glu Asn Val Val
195 200 205

Ser Lys Ile Tyr Glu Met Asn Glu Leu Leu Val Ile Lys Gly Ser Asp
210 215 220

Leu Arg Lys Ser Lys Lys Leu Ser Thr Pro Ser
225 230 235

<210> 137

<211> 4101

<212> DNA

<213> *Thermatoga maritima*

<400> 137

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<210> 138

<211> 1367

<212> PRT

<213> *Thermatoga maritima*

<400> 138

Met Lys Lys Ile Glu Asn Leu Lys Trp Lys Asn Val Ser Phe Lys Ser
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Leu Glu Ile Asp Pro Asp Ala Gly Val Val Leu Val Ser Val Glu Lys
20 25 30

Phe Ser Glu Glu Ile Glu Asp Leu Val Arg Leu Leu Glu Lys Lys Thr
35 40 45

Arg Phe Arg Val Ile Val Asn Gly Val Gln Lys Ser Asn Gly Asp Leu
50 55 60

Arg Gly Lys Ile Leu Ser Leu Leu Asn Gly Asn Val Pro Tyr Ile Lys
65 70 75 80

Asp Val Val Phe Glu Gly Asn Arg Leu Ile Leu Lys Val Leu Gly Asp
85 90 95

Phe Ala Arg Asp Arg Ile Ala Ser Lys Leu Arg Ser Thr Lys Lys Gln
100 105 110

Leu Asp Glu Leu Leu Pro Pro Gly Thr Glu Ile Met Leu Glu Val Val
115 120 125

Glu Pro Pro Glu Asp Leu Leu Lys Lys Glu Val Pro Gln Pro Glu Lys
130 135 140

Arg Glu Glu Pro Lys Gly Glu Glu Leu Lys Ile Glu Asp Glu Asn His
145 150 155 160

Ile Phe Gly Gln Lys Pro Arg Lys Ile Val Phe Thr Pro Ser Lys Ile
165 170 175

Phe Glu Tyr Asn Lys Lys Thr Ser Val Lys Gly Lys Ile Phe Lys Ile
180 185 190

Glu Lys Ile Glu Gly Lys Arg Thr Val Leu Leu Ile Tyr Leu Thr Asp
195 200 205

Gly Glu Asp Ser Leu Ile Cys Lys Val Phe Asn Asp Val Glu Lys Val
210 215 220

Glu Gly Lys Val Ser Val Gly Asp Val Ile Val Ala Thr Gly Asp Leu
225 230 235 240

Leu Leu Glu Asn Gly Glu Pro Thr Leu Tyr Val Lys Gly Ile Thr Lys

09716964-112100

245

250

255

Leu Pro Glu Ala Lys Arg Met Asp Lys Ser Pro Val Lys Arg Val Glu
 260 265 270

Leu His Ala His Thr Lys Phe Ser Asp Gln Asp Ala Ile Thr Asp Val
 275 280 285

Asn Glu Tyr Val Lys Arg Ala Lys Glu Trp Gly Phe Pro Ala Ile Ala
 290 295 300

Leu Thr Asp His Gly Asn Val Gln Ala Ile Pro Tyr Phe Tyr Asp Ala
 305 310 315 320

Ala Lys Glu Ala Gly Ile Lys Pro Ile Phe Gly Ile Glu Ala Tyr Leu
 325 330 335

Val Ser Asp Val Glu Pro Val Ile Arg Asn Leu Ser Asp Asp Ser Thr
 340 345 350

Phe Gly Asp Ala Thr Phe Val Val Leu Asp Phe Glu Thr Thr Gly Leu
 355 360 365

Asp Pro Gln Val Asp Glu Ile Ile Glu Ile Gly Ala Val Lys Ile Gln
 370 375 380

Gly Gly Gln Ile Val Asp Glu Tyr His Thr Leu Ile Lys Pro Ser Arg
 385 390 395 400

Glu Ile Ser Arg Lys Ser Ser Glu Ile Thr Gly Ile Thr Gln Glu Met
 405 410 415

Leu Glu Asn Lys Arg Ser Ile Glu Glu Val Leu Pro Glu Phe Leu Gly
 420 425 430

Phe Leu Glu Asp Ser Ile Ile Val Ala His Asn Ala Asn Phe Asp Tyr
 435 440 445

Arg Phe Leu Arg Leu Trp Ile Lys Lys Val Met Gly Leu Asp Trp Glu
 450 455 460

Arg Pro Tyr Ile Asp Thr Leu Ala Leu Ala Lys Ser Leu Leu Lys Leu
 465 470 475 480

Arg Ser Tyr Ser Leu Asp Ser Val Val Glu Lys Leu Gly Leu Gly Pro
 485 490 495

Phe Arg His His Arg Ala Leu Asp Asp Ala Arg Val Thr Ala Gln Val

500					505					510						
Phe	Leu	Arg	Phe	Val	Glu	Met	Met	Lys	Lys	Ile	Gly	Ile	Thr	Lys	Leu	
515					520					525						
Ser	Glu	Met	Glu	Lys	Leu	Lys	Asp	Thr	Ile	Asp	Tyr	Thr	Ala	Leu	Lys	
530					535					540						
Pro	Phe	His	Cys	Thr	Ile	Leu	Val	Gln	Asn	Lys	Lys	Gly	Leu	Lys	Asn	
545					550					555					560	
Leu	Tyr	Lys	Leu	Val	Ser	Asp	Ser	Tyr	Ile	Lys	Tyr	Phe	Tyr	Gly	Val	
565					570					575						
Pro	Arg	Ile	Leu	Lys	Ser	Glu	Leu	Ile	Glu	Asn	Arg	Glu	Gly	Leu	Leu	
580					585					590						
Val	Gly	Ser	Ala	Cys	Ile	Ser	Gly	Glu	Leu	Gly	Arg	Ala	Ala	Leu	Glu	
595					600					605						
Gly	Ala	Ser	Asp	Ser	Glu	Leu	Glu	Glu	Ile	Ala	Lys	Phe	Tyr	Asp	Tyr	
610					615					620						
Ile	Glu	Val	Met	Pro	Leu	Asp	Val	Ile	Ala	Glu	Asp	Glu	Glu	Asp	Leu	
625					630					635					640	
Asp	Arg	Glu	Arg	Leu	Lys	Glu	Val	Tyr	Arg	Lys	Leu	Tyr	Arg	Ile	Ala	
645					650					655						
Lys	Lys	Leu	Asn	Lys	Phe	Val	Val	Met	Thr	Gly	Asp	Val	His	Phe	Leu	
660					665					670						
Asp	Pro	Glu	Asp	Ala	Arg	Gly	Arg	Ala	Ala	Leu	Leu	Ala	Pro	Gln	Gly	
675					680					685						
Asn	Arg	Asn	Phe	Glu	Asn	Gln	Pro	Ala	Leu	Tyr	Leu	Arg	Thr	Thr	Glu	
690					695					700						
Glu	Met	Leu	Glu	Lys	Ala	Ile	Glu	Ile	Phe	Glu	Asp	Glu	Glu	Ile	Ala	
705					710					715					720	
Arg	Glu	Val	Val	Ile	Glu	Asn	Pro	Asn	Arg	Ile	Ala	Asp	Met	Ile	Glu	
725					730					735						
Glu	Val	Gln	Pro	Leu	Glu	Lys	Lys	Leu	His	Pro	Pro	Ile	Ile	Glu	Asn	
740					745					750						
Ala	Asp	Glu	Ile	Val	Arg	Asn	Leu	Thr	Met	Lys	Arg	Ala	Tyr	Glu	Ile	

755

760

765

Tyr Gly Asp Pro Leu Pro Glu Ile Val Gln Lys Arg Val Glu Lys Glu
770 775 780

Leu Asn Ala Ile Ile Asn His Gly Tyr Ala Val Leu Tyr Leu Ile Ala
785 790 795 800

Gln Glu Leu Val Gln Lys Ser Met Ser Asp Gly Tyr Val Val Gly Ser
805 810 815

Arg Gly Ser Val Gly Ser Ser Leu Val Ala Asn Leu Leu Gly Ile Thr
820 825 830

Glu Val Asn Pro Leu Pro Pro His Tyr Arg Cys Pro Glu Cys Lys Tyr
835 840 845

Phe Glu Val Val Glu Asp Asp Arg Tyr Gly Ala Gly Tyr Asp Leu Pro
850 855 860

Asn Lys Asn Cys Pro Arg Cys Gly Ala Pro Leu Arg Lys Asp Gly His
865 870 875 880

Gly Ile Pro Phe Glu Thr Phe Met Gly Phe Glu Gly Asp Lys Val Pro
885 890 895

Asp Ile Asp Leu Asn Phe Ser Gly Glu Tyr Gln Glu Arg Ala His Arg
900 905 910

Phe Val Glu Glu Leu Phe Gly Lys Asp His Val Tyr Arg Ala Gly Thr
915 920 925

Ile Asn Thr Ile Ala Glu Arg Ser Ala Val Gly Tyr Val Arg Ser Tyr
930 935 940

Glu Glu Lys Thr Gly Lys Lys Leu Arg Lys Ala Glu Met Glu Arg Leu
945 950 955 960

Val Ser Met Ile Thr Gly Val Lys Arg Thr Thr Gly Gln His Pro Gly
965 970 975

Gly Leu Met Ile Ile Pro Lys Asp Lys Glu Val Tyr Asp Phe Thr Pro
980 985 990

Ile Gln Tyr Pro Ala Asn Asp Arg Asn Ala Gly Val Phe Thr Thr His
995 1000 1005

Phe Ala Tyr Glu Thr Ile His Asp Asp Leu Val Lys Ile Asp Ala Leu

1010

1015

1020

Gly His Asp Asp Pro Thr Phe Ile Lys Met Leu Lys Asp Leu Thr Gly
 1025 1030 1035 1040

Ile Asp Pro Met Thr Ile Pro Met Asp Asp Pro Asp Thr Leu Ala Ile
 1045 1050 1055

Phe Ser Ser Val Lys Pro Leu Gly Val Asp Pro Val Glu Leu Glu Ser
 1060 1065 1070

Asp Val Gly Thr Tyr Gly Ile Pro Glu Phe Gly Thr Glu Phe Val Arg
 1075 1080 1085

Gly Met Leu Val Glu Thr Arg Pro Lys Ser Phe Ala Glu Leu Val Arg
 1090 1095 1100

Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp Leu Asn Asn Ala Arg
 1105 1110 1115 1120

Asp Trp Ile Asn Leu Gly Tyr Ala Lys Leu Ser Glu Val Ile Ser Cys
 1125 1130 1135

Arg Asp Asp Ile Met Asn Phe Leu Ile His Lys Gly Met Glu Pro Ser
 1140 1145 1150

Leu Ala Phe Lys Ile Met Glu Asn Val Arg Lys Gly Lys Gly Ile Thr
 1155 1160 1165

Glu Glu Met Glu Ser Glu Met Arg Arg Leu Lys Val Pro Glu Trp Phe
 1170 1175 1180

Ile Glu Ser Cys Lys Arg Ile Lys Tyr Leu Phe Pro Lys Ala His Ala
 1185 1190 1195 1200

Val Ala Tyr Val Ser Met Ala Phe Arg Ile Ala Tyr Phe Lys Val His
 1205 1210 1215

Tyr Pro Leu Gln Phe Tyr Ala Ala Tyr Phe Thr Ile Lys Gly Asp Gln
 1220 1225 1230

Phe Asp Pro Val Leu Val Leu Arg Gly Lys Glu Ala Ile Lys Arg Arg
 1235 1240 1245

Leu Arg Glu Leu Lys Ala Met Pro Ala Lys Asp Ala Gln Lys Lys Asn
 1250 1255 1260

Glu Val Ser Val Leu Glu Val Ala Leu Glu Met Ile Leu Arg Gly Phe

1265 1270 1275 1280

Ser Phe Leu Pro Pro Asp Ile Phe Lys Ser Asp Ala Lys Lys Phe Leu
 1285 1290 1295

Ile Glu Gly Asn Ser Leu Arg Ile Pro Phe Asn Lys Leu Pro Gly Leu
 1300 1305 1310

Gly Asp Ser Val Ala Glu Ser Ile Ile Arg Ala Arg Glu Glu Lys Pro
 1315 1320 1325

Phe Thr Ser Val Glu Asp Leu Met Lys Arg Thr Lys Val Asn Lys Asn
 1330 1335 1340

His Ile Glu Leu Met Lys Ser Leu Gly Val Leu Gly Asp Leu Pro Glu
 1345 1350 1355 1360

Thr Glu Gln Phe Thr Leu Phe
 1365

<210> 139
 <211> 567
 <212> DNA
 <213> *Thermatoga maritima*

<400> 139
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 aagatctaca gaaacaaagc gtttcaactct ctcgtgaatc ccagaataag aatccctgcg 180
 ctgattcaga aagttcacgg tatcagcaac atggacatcg tggaagcgcc agacatggac 240
 acagtttacg atcttttcag ggattacgtg aagggaacgg tgctcgtgtt tcacaacgcc 300
 aacttcgacc tcacttttct ggatatgatg gcaaaggaaa cgggaaactt tccaataacg 360
 aatccctaca tcgacacact cgatctttca gaagagatct ttggaaggcc tcattctctc 420
 aaatggctct ccgaaagact tggaataaaa accacgatac ggcaccgtgc tcttcagat 480
 gccctggtga ccgcaagagt ttttgtgaag cttgttgaat ttcttggtga aacagggtc 540
 aacgaattca tacgtggaaa acggggg 567

<210> 140
 <211> 189
 <212> PRT
 <213> *Thermatoga maritima*

<400> 140
 Met Leu Ala Met Ile Trp Asn Asp Thr Val Phe Cys Val Val Asp Thr
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Glu Thr Thr Gly Thr Asp Pro Phe Ala Gly Asp Arg Ile Val Glu Ile
 20 25 30
 Ala Ala Val Pro Val Phe Lys Gly Lys Ile Tyr Arg Asn Lys Ala Phe
 35 40 45
 His Ser Leu Val Asn Pro Arg Ile Arg Ile Pro Ala Leu Ile Gln Lys
 50 55 60
 Val His Gly Ile Ser Asn Met Asp Ile Val Glu Ala Pro Asp Met Asp
 65 70 75 80
 Thr Val Tyr Asp Leu Phe Arg Asp Tyr Val Lys Gly Thr Val Leu Val
 85 90 95
 Phe His Asn Ala Asn Phe Asp Leu Thr Phe Leu Asp Met Met Ala Lys
 100 105 110
 Glu Thr Gly Asn Phe Pro Ile Thr Asn Pro Tyr Ile Asp Thr Leu Asp
 115 120 125
 Leu Ser Glu Glu Ile Phe Gly Arg Pro His Ser Leu Lys Trp Leu Ser
 130 135 140
 Glu Arg Leu Gly Ile Lys Thr Thr Ile Arg His Arg Ala Leu Pro Asp
 145 150 155 160
 Ala Leu Val Thr Ala Arg Val Phe Val Lys Leu Val Glu Phe Leu Gly
 165 170 175
 Glu Asn Arg Val Asn Glu Phe Ile Arg Gly Lys Arg Gly
 180 185

<210> 141

<211> 1434

<212> DNA

<213> *Thermatoga maritima*

<400> 141

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 ttcgccggtc cgaggggaac ggggaagact actcttgcca gaattctcgc aaaatccctg 180
 aactgtgaga acagaaaggg agttgaaccc tgcaattcct gcagagcctg cagagagata 240
 gacgaggga ccttcatgga cgtgatagag ctgcacgcgg cctccaacag aggaatagac 300
 gagatcagaa gaatcagaga cgccgttgga tacaggccga tggaaggtaa atacaaagtc 360
 tacataatag acgaagttca catgctcagc aaagaagcct tcaacgcgct cctcaaaaca 420
 ctcgaagaac ctccttccca cgctcgtgttc gtgctggcaa cgacaaacct tgagaagggt 480

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ctgagcttca tcgcaaaaag agcctctgga ggcttgagag acgcgctcac catgctcgag 660
caggtgtgga agttctcgga aggaaagata gatctcgaga cggtagacag ggcgctcggg 720
ttgataccga tacagggtgt tcgcgattac gtgaacgcta tcttttctgg tgatgtgaaa 780
agggtcttca ccgttctcga cgacgtctat tacagcggga aggactacga ggtgctcatt 840
caggaagcag tcgaggatct ggtcgaagac ctggaaaagg agagaggggt ttaccagggt 900
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tccaccacaa acgttcagga aaacgatgtc agagaaaaaa acgataattc aaatgtacag 1080
cagaaagaag agaagaaaga aacggtgaag gcaaaagaag aaaaacagga agacagcgag 1140
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tttgtcgtc tcagcctctc agaggtgcag tttgacggag aaaaggtgat tatttctttt 1260
gattcatcga aagctatgca ttacgagttg atgaagaaaa aactgcctga gctggaaaaac 1320
attttttcta gaaaactcgg gaaaaaagta gaagttgaac ttcgactgat gggaaaagaa 1380
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<210> 142

<211> 478

<212> PRT

<213> *Thermatoga maritima*

<400> 142

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Val Asn Gln Asp His Val Lys Lys Ala Ile Ile Gly Ala Ile Gln Lys
          20                      25                      30

Asn Ser Val Ala His Gly Tyr Ile Phe Ala Gly Pro Arg Gly Thr Gly
      35                      40                      45

Lys Thr Thr Leu Ala Arg Ile Leu Ala Lys Ser Leu Asn Cys Glu Asn
      50                      55                      60

Arg Lys Gly Val Glu Pro Cys Asn Ser Cys Arg Ala Cys Arg Glu Ile
      65                      70                      75                      80

Asp Glu Gly Thr Phe Met Asp Val Ile Glu Leu Asp Ala Ala Ser Asn
          85                      90                      95

Arg Gly Ile Asp Glu Ile Arg Arg Ile Arg Asp Ala Val Gly Tyr Arg
      100                      105                      110

Pro Met Glu Gly Lys Tyr Lys Val Tyr Ile Ile Asp Glu Val His Met
      115                      120                      125

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Leu Thr Lys Glu Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu Glu Pro
 130 135 140
 Pro Ser His Val Val Phe Val Leu Ala Thr Thr Asn Leu Glu Lys Val
 145 150 155 160
 Pro Pro Thr Ile Ile Ser Arg Cys Gln Val Phe Glu Phe Arg Asn Ile
 165 170 175
 Pro Asp Glu Leu Ile Glu Lys Arg Leu Gln Glu Val Ala Glu Ala Glu
 180 185 190
 Gly Ile Glu Ile Asp Arg Glu Ala Leu Ser Phe Ile Ala Lys Arg Ala
 195 200 205
 Ser Gly Gly Leu Arg Asp Ala Leu Thr Met Leu Glu Gln Val Trp Lys
 210 215 220
 Phe Ser Glu Gly Lys Ile Asp Leu Glu Thr Val His Arg Ala Leu Gly
 225 230 235 240
 Leu Ile Pro Ile Gln Val Val Arg Asp Tyr Val Asn Ala Ile Phe Ser
 245 250 255
 Gly Asp Val Lys Arg Val Phe Thr Val Leu Asp Asp Val Tyr Tyr Ser
 260 265 270
 Gly Lys Asp Tyr Glu Val Leu Ile Gln Glu Ala Val Glu Asp Leu Val
 275 280 285
 Glu Asp Leu Glu Arg Glu Arg Gly Val Tyr Gln Val Ser Ala Asn Asp
 290 295 300
 Ile Val Gln Val Ser Arg Gln Leu Leu Asn Leu Leu Arg Glu Ile Lys
 305 310 315 320
 Phe Ala Glu Glu Lys Arg Leu Val Cys Lys Val Gly Ser Ala Tyr Ile
 325 330 335
 Ala Thr Arg Phe Ser Thr Thr Asn Val Gln Glu Asn Asp Val Arg Glu
 340 345 350
 Lys Asn Asp Asn Ser Asn Val Gln Gln Lys Glu Glu Lys Lys Glu Thr
 355 360 365
 Val Lys Ala Lys Glu Glu Lys Gln Glu Asp Ser Glu Phe Glu Lys Arg
 370 375 380

Phe Lys Glu Leu Met Glu Glu Leu Lys Glu Lys Gly Asp Leu Ser Ile
385 390 395 400

Phe Val Ala Leu Ser Leu Ser Glu Val Gln Phe Asp Gly Glu Lys Val
405 410 415

Ile Ile Ser Phe Asp Ser Ser Lys Ala Met His Tyr Glu Leu Met Lys
420 425 430

Lys Lys Leu Pro Glu Leu Glu Asn Ile Phe Ser Arg Lys Leu Gly Lys
435 440 445

Lys Val Glu Val Glu Leu Arg Leu Met Gly Lys Glu Glu Thr Ile Glu
450 455 460

Lys Val Ser Gln Lys Ile Leu Arg Leu Phe Glu Gln Glu Gly
465 470 475

<210> 143

<211> 1098

<212> DNA

<213> *Thermatoga maritima*

<400> 143

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aattttctaca tctgcgcgac cgatctcgag accggagtca aagcaaccgt gaatgccgct 180
gaaatctccg gtgaggcacg ttttgtggta ccaggagatg tcattcagaa gatgggtcaag 240
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gccgagtctg gaataacctt cgaagttgac acttcgctcc tcgaggaaat ggttgaaaag 420
gtcatcttcg ccgctgccaa agacgagttc atgcgaaatc tgaatggagt tttctgggaa 480
ctccacaaga atcttctcag gctgggttgc agtgatgggt tcagacttgc acttgctgaa 540
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gttcaaaacg tgctggacaa cacaacggag ccgactataa cggtgaggta cgatggaaga 660
agggtttctc tgctgacaaa tgatgtagaa acggtgatga gagtggtcga cgctgaattt 720
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gaactcaggg aatctttgaa gaggggtgat gtgattgcca gcaagggaag cgagtccgtg 840
aagttcgaaa tagaagaaaa cgttatgaga cttgtgagca agagcccga ttatggagaa 900
gtgggtcgatg aagttgaagt tcaaaaagaa ggggaagatc tcgtgatcgc tttcaaccgg 960
aagttcatcg aggacgtttt gaagcacatt gagactgaag aaatcgaaat gaacttcgtt 1020
gattctacca gtccatgtca gataaatcca ctcgatattt ctggatacct ttacatagtg 1080
atgccccatca gactggca                                     1098
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<210> 144

<211> 366

<212> PRT

<213> *Thermatoga maritima*

<400> 144

Met Lys Val Thr Val Thr Thr Leu Glu Leu Lys Asp Lys Ile Thr Ile
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Ala Ser Lys Ala Leu Ala Lys Lys Ser Val Lys Pro Ile Leu Ala Gly
20 25 30

Phe Leu Phe Glu Val Lys Asp Gly Asn Phe Tyr Ile Cys Ala Thr Asp
35 40 45

Leu Glu Thr Gly Val Lys Ala Thr Val Asn Ala Ala Glu Ile Ser Gly
50 55 60

Glu Ala Arg Phe Val Val Pro Gly Asp Val Ile Gln Lys Met Val Lys
65 70 75 80

Val Leu Pro Asp Glu Ile Thr Glu Leu Ser Leu Glu Gly Asp Ala Leu
85 90 95

Val Ile Ser Ser Gly Ser Thr Val Phe Arg Ile Thr Thr Met Pro Ala
100 105 110

Asp Glu Phe Pro Glu Ile Thr Pro Ala Glu Ser Gly Ile Thr Phe Glu
115 120 125

Val Asp Thr Ser Leu Leu Glu Glu Met Val Glu Lys Val Ile Phe Ala
130 135 140

Ala Ala Lys Asp Glu Phe Met Arg Asn Leu Asn Gly Val Phe Trp Glu
145 150 155 160

Leu His Lys Asn Leu Leu Arg Leu Val Ala Ser Asp Gly Phe Arg Leu
165 170 175

Ala Leu Ala Glu Glu Gln Ile Glu Asn Glu Glu Glu Ala Ser Phe Leu
180 185 190

Leu Ser Leu Lys Ser Met Lys Glu Val Gln Asn Val Leu Asp Asn Thr
195 200 205

Thr Glu Pro Thr Ile Thr Val Arg Tyr Asp Gly Arg Arg Val Ser Leu
210 215 220

Ser Thr Asn Asp Val Glu Thr Val Met Arg Val Val Asp Ala Glu Phe
225 230 235 240

Pro Asp Tyr Lys Arg Val Ile Pro Glu Thr Phe Lys Thr Lys Val Val
 245 250 255

Val Ser Arg Lys Glu Leu Arg Glu Ser Leu Lys Arg Val Met Val Ile
 260 265 270

Ala Ser Lys Gly Ser Glu Ser Val Lys Phe Glu Ile Glu Glu Asn Val
 275 280 285

Met Arg Leu Val Ser Lys Ser Pro Asp Tyr Gly Glu Val Val Asp Glu
 290 295 300

Val Glu Val Gln Lys Glu Gly Glu Asp Leu Val Ile Ala Phe Asn Pro
 305 310 315 320

Lys Phe Ile Glu Asp Val Leu Lys His Ile Glu Thr Glu Glu Ile Glu
 325 330 335

Met Asn Phe Val Asp Ser Thr Ser Pro Cys Gln Ile Asn Pro Leu Asp
 340 345 350

Ile Ser Gly Tyr Leu Tyr Ile Val Met Pro Ile Arg Leu Ala
 355 360 365

<210> 145

<211> 972

<212> DNA

<213> *Thermatoga maritima*

<400> 145

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 gatttcataa ggtctttact caggacaaag acgatctttt ccaacaagac gatcattgac 180
 atcgtcaatt tcgatgagtg gaaagcacag gagcagaagc gtctcgttga acttttgaaa 240
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 ttcagggaga atggtttgct catcgataaa gatgcccttc agctgttttt ctccaagggt 420
 ggaacgaacg acctgatcat agaaagggag attgaaaaac tgaaagctta ttccgaggac 480
 agaaagataa cggtagaaga cgtggaagag gtcgttttta cctatcagac tccgggatac 540
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 cagctgtgga aaaccacaga gtccgtggtg attgccactg tccttgcgaa tcacttcttg 660
 gatctcttca aaatcctcgt tcttgtaga aagaaaagat actacacctg gcctgatgtg 720
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 ccaaaaccgt tcttcacga gttcatagaa gaggtggcac tggatgtata ttctcttcag 960

<210> 146

<211> 324

<212> PRT

<213> *Thermatoga maritima*

<400> 146

Met Pro Val Thr Phe Leu Thr Gly Thr Ala Glu Thr Gln Lys Glu Glu
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Leu Ile Lys Lys Leu Leu Lys Asp Gly Asn Val Glu Tyr Ile Arg Ile
 20 25 30

His Pro Glu Asp Pro Asp Lys Ile Asp Phe Ile Arg Ser Leu Leu Arg
 35 40 45

Thr Lys Thr Ile Phe Ser Asn Lys Thr Ile Ile Asp Ile Val Asn Phe
 50 55 60

Asp Glu Trp Lys Ala Gln Glu Gln Lys Arg Leu Val Glu Leu Leu Lys
 65 70 75 80

Asn Val Pro Glu Asp Val His Ile Phe Ile Arg Ser Gln Lys Thr Gly
 85 90 95

Gly Lys Gly Val Ala Leu Glu Leu Pro Lys Pro Trp Glu Thr Asp Lys
 100 105 110

Trp Leu Glu Trp Ile Glu Lys Arg Phe Arg Glu Asn Gly Leu Leu Ile
 115 120 125

Asp Lys Asp Ala Leu Gln Leu Phe Phe Ser Lys Val Gly Thr Asn Asp
 130 135 140

Leu Ile Ile Glu Arg Glu Ile Glu Lys Leu Lys Ala Tyr Ser Glu Asp
 145 150 155 160

Arg Lys Ile Thr Val Glu Asp Val Glu Glu Val Val Phe Thr Tyr Gln
 165 170 175

Thr Pro Gly Tyr Asp Asp Phe Cys Phe Ala Val Ser Glu Gly Lys Arg
 180 185 190

Lys Leu Ala His Ser Leu Leu Ser Gln Leu Trp Lys Thr Thr Glu Ser
 195 200 205

Val Val Ile Ala Thr Val Leu Ala Asn His Phe Leu Asp Leu Phe Lys
 210 215 220

Ile Leu Val Leu Val Thr Lys Lys Arg Tyr Tyr Thr Trp Pro Asp Val
 225 230 235 240

Ser Arg Val Ser Lys Glu Leu Gly Ile Pro Val Pro Arg Val Ala Arg
 245 250 255

Phe Leu Gly Phe Ser Phe Lys Thr Trp Lys Phe Lys Val Met Asn His
 260 265 270

Leu Leu Tyr Tyr Asp Val Lys Lys Val Arg Lys Ile Leu Arg Asp Leu
 275 280 285

Tyr Asp Leu Asp Arg Ala Val Lys Ser Glu Glu Asp Pro Lys Pro Phe
 290 295 300

Phe His Glu Phe Ile Glu Glu Val Ala Leu Asp Val Tyr Ser Leu Gln
 305 310 315 320

Arg Asp Glu Glu

<210> 147

<211> 936

<212> DNA

<213> *Thermatoga maritima*

<400> 147

atgaacgatt tgatcagaaa gtacgctaaa gatcaactgg aaactttgaa aaggatcata 60
 gaaaagtctg aaggaatata catcctcata aatggagaag atctctcgta tccgagagaa 120
 gtatcccttg aacttccga gtacgtggag aaatttcccc cgaaggcctc ggatgttctg 180
 gagatagatc ccgaggggga gaacataggc atagacgaca tcagaacgat aaaggacttc 240
 ctgaactaca gccccgagct ctacacgaga aagtacgtga tagtccacga ctgtgaaaga 300
 atgaccagc aggcggcgaa cgcgtttctg aaggcccttg aagaaccacc agaatacgct 360
 gtgatcgttc tgaacactcg ccgctggcat tatctactgc cgacgataaa gagccgagtg 420
 ttcagagtgg ttgtgaacgt tccaaaggag ttcagagatc tcgtgaaaga gaaaatagga 480
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 aaacttggtg cggaaaaaact ttctggattg atggaaaagtc tcaaagtttt ggagacggaa 600
 aaactcttga aaaaggtcct tccaaaaggc ctcgaagggt atctcgcatg tagggagctc 660
 ctggagagat tttcaaagggt ggaatcgaag gaattctttg cgctttttga tcaggtgact 720
 aacacgataa caggaaaaga cgcgtttctt ttgatccaga gactgacaag aatcattctc 780
 cacgaaaaca catgggaaag cgttgaagat caaaaaagcg tgtctttcct cgattcaatt 840
 ctcagggtga agatagcgaa tctgaacaac aaactcactc tgatgaacat cctcgcgata 900
 cacagagaga gaaagagagg tgtcaacgct tggagc 936

<210> 148
 <211> 311
 <212> PRT
 <213> *Thermatoga maritima*

<400> 148

Met	Asn	Asp	Leu	Ile	Arg	Lys	Tyr	Ala	Lys	Asp	Gln	Leu	Glu	Thr	Leu
1				5					10					15	
Lys	Arg	Ile	Ile	Glu	Lys	Ser	Glu	Gly	Ile	Ser	Ile	Leu	Ile	Asn	Gly
			20					25					30		
Glu	Asp	Leu	Ser	Tyr	Pro	Arg	Glu	Val	Ser	Leu	Glu	Leu	Pro	Glu	Tyr
		35					40					45			
Val	Glu	Lys	Phe	Pro	Pro	Lys	Ala	Ser	Asp	Val	Leu	Glu	Ile	Asp	Pro
	50					55					60				
Glu	Gly	Glu	Asn	Ile	Gly	Ile	Asp	Asp	Ile	Arg	Thr	Ile	Lys	Asp	Phe
65					70					75					80
Leu	Asn	Tyr	Ser	Pro	Glu	Leu	Tyr	Thr	Arg	Lys	Tyr	Val	Ile	Val	His
				85					90					95	
Asp	Cys	Glu	Arg	Met	Thr	Gln	Gln	Ala	Ala	Asn	Ala	Phe	Leu	Lys	Ala
			100					105					110		
Leu	Glu	Glu	Pro	Pro	Glu	Tyr	Ala	Val	Ile	Val	Leu	Asn	Thr	Arg	Arg
		115					120					125			
Trp	His	Tyr	Leu	Leu	Pro	Thr	Ile	Lys	Ser	Arg	Val	Phe	Arg	Val	Val
	130					135					140				
Val	Asn	Val	Pro	Lys	Glu	Phe	Arg	Asp	Leu	Val	Lys	Glu	Lys	Ile	Gly
145					150					155					160
Asp	Leu	Trp	Glu	Glu	Leu	Pro	Leu	Leu	Glu	Arg	Asp	Phe	Lys	Thr	Ala
			165						170					175	
Leu	Glu	Ala	Tyr	Lys	Leu	Gly	Ala	Glu	Lys	Leu	Ser	Gly	Leu	Met	Glu
			180					185					190		
Ser	Leu	Lys	Val	Leu	Glu	Thr	Glu	Lys	Leu	Leu	Lys	Lys	Val	Leu	Ser
		195					200					205			
Lys	Gly	Leu	Glu	Gly	Tyr	Leu	Ala	Cys	Arg	Glu	Leu	Leu	Glu	Arg	Phe
	210					215					220				

Ser Lys Val Glu Ser Lys Glu Phe Phe Ala Leu Phe Asp Gln Val Thr
225 230 235 240

Asn Thr Ile Thr Gly Lys Asp Ala Phe Leu Leu Ile Gln Arg Leu Thr
245 250 255

Arg Ile Ile Leu His Glu Asn Thr Trp Glu Ser Val Glu Asp Lys Ser
260 265 270

Val Ser Phe Leu Asp Ser Ile Leu Arg Val Lys Ile Ala Asn Leu Asn
275 280 285

Asn Lys Leu Thr Leu Met Asn Ile Leu Ala Ile His Arg Glu Arg Lys
290 295 300

Arg Gly Val Asn Ala Trp Ser
305 310

<210> 149

<211> 423

<212> DNA

<213> *Thermatoga maritima*

<400> 149

atgtcttttct tcaacaagat cataactcata ggaagactcg tgagagatcc cgaagagaga 60
tacacgctca gcggaactcc agtcaccacc ttcaccatag cggtaggacag gggtcccaga 120
aagaacgcgc cggacgacgc tcaaacgact gatttcttca ggatcgtcac ctttggaaga 180
ctggcagagt tcgctagaac ctatctcacc aaaggaaggc tcgttctcgt cgaagggtgaa 240
atgagaatga gaagatggga aacacccact ggagaaaaga gggatatctcc ggaggttggtc 300
gcaaacgttg ttagattcat ggacagaaaa cctgctgaaa cagttagcga gactgaagag 360
gagctggaaa taccggaaga agacttttcc agcgatacct tcagtgaaga tgaaccacca 420
ttt 423

<210> 150

<211> 141

<212> PRT

<213> *Thermatoga maritima*

<400> 150

Met Ser Phe Phe Asn Lys Ile Ile Leu Ile Gly Arg Leu Val Arg Asp
1 5 10 15

Pro Glu Glu Arg Tyr Thr Leu Ser Gly Thr Pro Val Thr Thr Phe Thr
20 25 30

Ile Ala Val Asp Arg Val Pro Arg Lys Asn Ala Pro Asp Asp Ala Gln
 35 40 45

Thr Thr Asp Phe Phe Arg Ile Val Thr Phe Gly Arg Leu Ala Glu Phe
 50 55 60

Ala Arg Thr Tyr Leu Thr Lys Gly Arg Leu Val Leu Val Glu Gly Glu
 65 70 75 80

Met Arg Met Arg Arg Trp Glu Thr Pro Thr Gly Glu Lys Arg Val Ser
 85 90 95

Pro Glu Val Val Ala Asn Val Val Arg Phe Met Asp Arg Lys Pro Ala
 100 105 110

Glu Thr Val Ser Glu Thr Glu Glu Glu Leu Glu Ile Pro Glu Glu Asp
 115 120 125

Phe Ser Ser Asp Thr Phe Ser Glu Asp Glu Pro Pro Phe
 130 135 140

<210> 151

<211> 1353

<212> DNA

<213> *Thermatoga maritima*

<400> 151

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 gatccgtcgg taataaacga cgttcttgaa attttgagcc acgaagattt ctatctgaaa 120
 aaacaccaac acatcttcag agcgatggaa gagctttacg acgaaggaaa accggtggac 180
 gtgggtttccg tctgtgacaa gcttcaaagc atgggaaaac tcgaggaagt aggtggagat 240
 ctggaagtgg cccagctcgc tgaggctgtg cccagttctg cacacgcact tcactacgcg 300
 gagatcgtca aggaaaaatc cattctgagg aaactcattg agatctccag aaaaatctca 360
 gaaagtgcct acatggaaga agatgtggag atcctgctcg acaacgcaga aaagatgac 420
 ttcgagatct cagagatgaa aacgacaaaa tcctacgac atctgagagg catcatgcac 480
 cgggtgtttg aaaacctgga gaacttcagg gaaagagcca accttataga acccggtgtg 540
 ctcataacgg gactaccaac gggattcaaa agtctggaca aacagaccac agggttccac 600
 agtccgatc tggtgataat agcagcgaga ccctccatgg gaaaaacctc cttcgcactc 660
 tcaatagcga ggaacatggc tgtcaatttc gaaatccccg tcggaatatt cagtctcgag 720
 atgtccaagg aacagctcgc tcaaagacta ctcagcatgg agtccggtgt ggatctttac 780
 agcatcagaa caggatacct ggatcaggag aagtgggaaa gactcacaat agcggcttct 840
 aaactctaca aagcacccat agttgtggac gatgagtcac tcctcgatcc gcgatcgttg 900
 agggcaaaaag cgagaaggat gaaaaaagaa tacgatgtaa aagccatttt tgtcgactat 960
 ctccagctca tgcacctgaa aggaagaaaa gaaagcagac agcaggagat atccgagatc 1020
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 ctttcgaggg ccgtagaaca gagagaagac aaaagaccga ggctgagtga cctcagggaa 1140
 tccggtgcga tagaacagga cgcagacaca gtcattctca tctacaggga ggaatattac 1200

aggagcaaaa aatccaaaga ggaaagcaag cttcacgaac ctcacgaagc tgaaatcata 1260
 ataggtaaac agagaaacgg tcccgttga acgatcactc tgatcttcga cccagaacg 1320
 gttacgttcc atgaagtcga tgtggtgcat tca 1353

<210> 152

<211> 451

<212> PRT

<213> *Thermatoga maritima*

<400> 152

Met Arg Val Pro Pro His Asn Leu Glu Ala Glu Val Ala Val Leu Gly
 1 5 10 15

Ser Ile Leu Ile Asp Pro Ser Val Ile Asn Asp Val Leu Glu Ile Leu
 20 25 30

Ser His Glu Asp Phe Tyr Leu Lys Lys His Gln His Ile Phe Arg Ala
 35 40 45

Met Glu Glu Leu Tyr Asp Glu Gly Lys Pro Val Asp Val Val Ser Val
 50 55 60

Cys Asp Lys Leu Gln Ser Met Gly Lys Leu Glu Glu Val Gly Gly Asp
 65 70 75 80

Leu Glu Val Ala Gln Leu Ala Glu Ala Val Pro Ser Ser Ala His Ala
 85 90 95

Leu His Tyr Ala Glu Ile Val Lys Glu Lys Ser Ile Leu Arg Lys Leu
 100 105 110

Ile Glu Ile Ser Arg Lys Ile Ser Glu Ser Ala Tyr Met Glu Glu Asp
 115 120 125

Val Glu Ile Leu Leu Asp Asn Ala Glu Lys Met Ile Phe Glu Ile Ser
 130 135 140

Glu Met Lys Thr Thr Lys Ser Tyr Asp His Leu Arg Gly Ile Met His
 145 150 155 160

Arg Val Phe Glu Asn Leu Glu Asn Phe Arg Glu Arg Ala Asn Leu Ile
 165 170 175

Glu Pro Gly Val Leu Ile Thr Gly Leu Pro Thr Gly Phe Lys Ser Leu
 180 185 190

Asp Lys Gln Thr Thr Gly Phe His Ser Ser Asp Leu Val Ile Ile Ala

195	200	205
Ala Arg Pro Ser Met Gly Lys Thr Ser Phe Ala Leu Ser Ile Ala Arg		
210	215	220
Asn Met Ala Val Asn Phe Glu Ile Pro Val Gly Ile Phe Ser Leu Glu		
225	230	235 240
Met Ser Lys Glu Gln Leu Ala Gln Arg Leu Leu Ser Met Glu Ser Gly		
	245	250 255
Val Asp Leu Tyr Ser Ile Arg Thr Gly Tyr Leu Asp Gln Glu Lys Trp		
	260	265 270
Glu Arg Leu Thr Ile Ala Ala Ser Lys Leu Tyr Lys Ala Pro Ile Val		
	275	280 285
Val Asp Asp Glu Ser Leu Leu Asp Pro Arg Ser Leu Arg Ala Lys Ala		
	290	295 300
Arg Arg Met Lys Lys Glu Tyr Asp Val Lys Ala Ile Phe Val Asp Tyr		
	305	310 315 320
Leu Gln Leu Met His Leu Lys Gly Arg Lys Glu Ser Arg Gln Gln Glu		
	325	330 335
Ile Ser Glu Ile Ser Arg Ser Leu Lys Leu Leu Ala Arg Glu Leu Asp		
	340	345 350
Ile Val Val Ile Ala Leu Ser Gln Leu Ser Arg Ala Val Glu Gln Arg		
	355	360 365
Glu Asp Lys Arg Pro Arg Leu Ser Asp Leu Arg Glu Ser Gly Ala Ile		
	370	375 380
Glu Gln Asp Ala Asp Thr Val Ile Phe Ile Tyr Arg Glu Glu Tyr Tyr		
	385	390 395 400
Arg Ser Lys Lys Ser Lys Glu Glu Ser Lys Leu His Glu Pro His Glu		
	405	410 415
Ala Glu Ile Ile Ile Gly Lys Gln Arg Asn Gly Pro Val Gly Thr Ile		
	420	425 430
Thr Leu Ile Phe Asp Pro Arg Thr Val Thr Phe His Glu Val Asp Val		
	435	440 445
Val His Ser		

<210> 153
 <211> 1695
 <212> DNA
 <213> *Thermatoga maritima*

<400> 153
 gtgattcctc gagaggtcat cgaggaaata aaagaaaagg ttgacatcgt agaggtcatt 60
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 tcagaaacca atccttcttt ctacgttcat ccgggtttga agatatacca ttgtttcggc 180
 tgcggtgcga gtggagacgt catcaaattt cttcaagaaa tggaagggat cagtttccag 240
 gaagcgctgg aaagacttgc caaaagagct gggattgattc tttctctcta cagaacagaa 300
 gggacttctg aatacggaaa atacattcgt ttgtacgaag aaacgtggaa aaggtagctc 360
 aaagagctgg agaaatcgaa agaggcaaaa gactatttaa aaagcagagg cttctctgaa 420
 gaagatatag caaagtctcg ctttgggtac gtccccaaga gatccagcat ctctatagaa 480
 gttgcagaag gcatgaacat aacactggaa gaacttgta gatacggtat cgcgctgaaa 540
 aagggtgatc gattcgttga tagattcgaa ggaagaatcg ttgttccaat aaagaacgac 600
 agtggtcata ttgtggcttt tgggtggcgt gctctcggca acgaagaacc gaagtatttg 660
 aactctccag agaccaggtt tttttcgaag aagaagacc ttttctctt cgatgaggcg 720
 aaaaaagtgg caaaagaggt tggttttttc gtcattcaccg aaggctactt cgacgcgctc 780
 gcattcagaa aggatggaat accaacggcg gtcgctgttc ttggggcgag tctttcaaga 840
 gaggcgattc taaaactttc ggcgtattcg aaaaacgtca tactgtgttt cgataatgac 900
 aaagcagggt tcagagccac tctcaaatcc ctcgaggatc tcctagacta cgaattcaac 960
 gtgcttgtgg caacccccct tccttcaaaa gaccagatg aactctttca gaaagaagga 1020
 gaaggttcat tgaaaaagat gctgaaaaac tcgcgttcgt tcgaatattt tctgggtgacg 1080
 gctggtgagg tcttctttga caggaacagc cccgcgggtg tgagatccta cttttctttc 1140
 ctcaaagggtt ggggtccaaa gatgagaagg aaaggatatt tgaaacacat agaaaatctc 1200
 gtgaatgagg tttcatcttc tctccagata ccagaaaacc agattttgaa cttttttgaa 1260
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 gggagaggac tggcttattt gtttttgaac tacgaggatt tgagggaaaa gattctggaa 1380
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 ggagaagatt tgaacaaagt catagaaaac ttcccaaaag agctgaaaga ctggattttt 1500
 gagacaatag aaagcattcc tcctccaaag gatcccgaga aattcctcgg tgacctctcc 1560
 gaaaagttga aaatccgacg gatagagaga cgtatcgag aaatagatga tatgataaag 1620
 aaagcttcaa acgatgaaga aaggcgtctt cttctctcta tgaaagtgga tctcctcaga 1680
 aaaataaaga ggagg 1695

<210> 154
 <211> 565
 <212> PRT
 <213> *Thermatoga maritima*

<400> 154
 Met Ile Pro Arg Glu Val Ile Glu Glu Ile Lys Glu Lys Val Asp Ile
 1 5 10 15

Val	Glu	Val	Ile	Ser	Glu	Tyr	Val	Asn	Leu	Thr	Arg	Val	Gly	Ser	Ser	20	25	30
Tyr	Arg	Ala	Leu	Cys	Pro	Phe	His	Ser	Glu	Thr	Asn	Pro	Ser	Phe	Tyr	35	40	45
Val	His	Pro	Gly	Leu	Lys	Ile	Tyr	His	Cys	Phe	Gly	Cys	Gly	Ala	Ser	50	55	60
Gly	Asp	Val	Ile	Lys	Phe	Leu	Gln	Glu	Met	Glu	Gly	Ile	Ser	Phe	Gln	65	70	75
Glu	Ala	Leu	Glu	Arg	Leu	Ala	Lys	Arg	Ala	Gly	Ile	Asp	Leu	Ser	Leu	85	90	95
Tyr	Arg	Thr	Glu	Gly	Thr	Ser	Glu	Tyr	Gly	Lys	Tyr	Ile	Arg	Leu	Tyr	100	105	110
Glu	Glu	Thr	Trp	Lys	Arg	Tyr	Val	Lys	Glu	Leu	Glu	Lys	Ser	Lys	Glu	115	120	125
Ala	Lys	Asp	Tyr	Leu	Lys	Ser	Arg	Gly	Phe	Ser	Glu	Glu	Asp	Ile	Ala	130	135	140
Lys	Phe	Gly	Phe	Gly	Tyr	Val	Pro	Lys	Arg	Ser	Ser	Ile	Ser	Ile	Glu	145	150	155
Val	Ala	Glu	Gly	Met	Asn	Ile	Thr	Leu	Glu	Glu	Leu	Val	Arg	Tyr	Gly	165	170	175
Ile	Ala	Leu	Lys	Lys	Gly	Asp	Arg	Phe	Val	Asp	Arg	Phe	Glu	Gly	Arg	180	185	190
Ile	Val	Val	Pro	Ile	Lys	Asn	Asp	Ser	Gly	His	Ile	Val	Ala	Phe	Gly	195	200	205
Gly	Arg	Ala	Leu	Gly	Asn	Glu	Glu	Pro	Lys	Tyr	Leu	Asn	Ser	Pro	Glu	210	215	220
Thr	Arg	Tyr	Phe	Ser	Lys	Lys	Lys	Thr	Leu	Phe	Leu	Phe	Asp	Glu	Ala	225	230	235
Lys	Lys	Val	Ala	Lys	Glu	Val	Gly	Phe	Phe	Val	Ile	Thr	Glu	Gly	Tyr	245	250	255
Phe	Asp	Ala	Leu	Ala	Phe	Arg	Lys	Asp	Gly	Ile	Pro	Thr	Ala	Val	Ala	260	265	270

Val Leu Gly Ala Ser Leu Ser Arg Glu Ala Ile Leu Lys Leu Ser Ala
 275 280 285
 Tyr Ser Lys Asn Val Ile Leu Cys Phe Asp Asn Asp Lys Ala Gly Phe
 290 295 300
 Arg Ala Thr Leu Lys Ser Leu Glu Asp Leu Leu Asp Tyr Glu Phe Asn
 305 310 315 320
 Val Leu Val Ala Thr Pro Ser Pro Tyr Lys Asp Pro Asp Glu Leu Phe
 325 330 335
 Gln Lys Glu Gly Glu Gly Ser Leu Lys Lys Met Leu Lys Asn Ser Arg
 340 345 350
 Ser Phe Glu Tyr Phe Leu Val Thr Ala Gly Glu Val Phe Phe Asp Arg
 355 360 365
 Asn Ser Pro Ala Gly Val Arg Ser Tyr Leu Ser Phe Leu Lys Gly Trp
 370 375 380
 Val Gln Lys Met Arg Arg Lys Gly Tyr Leu Lys His Ile Glu Asn Leu
 385 390 395 400
 Val Asn Glu Val Ser Ser Ser Leu Gln Ile Pro Glu Asn Gln Ile Leu
 405 410 415
 Asn Phe Phe Glu Ser Asp Arg Ser Asn Thr Met Pro Val His Glu Thr
 420 425 430
 Lys Ser Ser Lys Val Tyr Asp Glu Gly Arg Gly Leu Ala Tyr Leu Phe
 435 440 445
 Leu Asn Tyr Glu Asp Leu Arg Glu Lys Ile Leu Glu Leu Asp Leu Glu
 450 455 460
 Val Leu Glu Asp Lys Asn Ala Arg Glu Phe Phe Lys Arg Val Ser Leu
 465 470 475 480
 Gly Glu Asp Leu Asn Lys Val Ile Glu Asn Phe Pro Lys Glu Leu Lys
 485 490 495
 Asp Trp Ile Phe Glu Thr Ile Glu Ser Ile Pro Pro Pro Lys Asp Pro
 500 505 510
 Glu Lys Phe Leu Gly Asp Leu Ser Glu Lys Leu Lys Ile Arg Arg Ile
 515 520 525

Glu Arg Arg Ile Ala Glu Ile Asp Asp Met Ile Lys Lys Ala Ser Asn
530 535 540

Asp Glu Glu Arg Arg Leu Leu Ser Met Lys Val Asp Leu Leu Arg
545 550 555 560

Lys Ile Lys Arg Arg
565

<210> 155

<211> 804

<212> DNA

<213> *Thermus thermophilus*

<400> 155

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cttccccgcc tcaccgcca gacctgctc ttctccggcc ccgagggggg ggggcggcgc 120
accgtggccc gctggtacgc ctggggggctc aaccgcgggt tccccccgcc ctccctgggg 180
gagcaccggg acgtcctcga ggtggggccc aaggcccggg acctccgggg ccgggcccag 240
gtgcggctgg aggaggtggc gcccctcttg gagtgggtgt ccagccaccc ccgggagcgg 300
gtgaaggtgg ccatacctgga ctcgccccac ctctcaccg aggcgcgcgc caacgccctc 360
ctcaagctcc tggaggagcc cccttcctac gcccgcatcg tcctcatcgc cccaagccgc 420
gccaccctcc tccccaccct ggcctcccg gccacggagg tggcattcgc ccccggtgcc 480
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ccgggccgcc tccttagggc cctccaggac ccggaggggt accgggcccg catggccagg 600
gcgcaaaggg tcctgaaagc ccgcccctg gaggcctcgc ctttgcctcg ggagcttttg 660
gccgaggagg aggggggtcca cgccctccac gccgtcctaa agcggccgga gcacctcctt 720
gccctggagc gggcgcgga ggccctggag gggtagctga gccccgagct ggtcctcgcc 780
cggctggcct tagacttaga gaca 804

<210> 156

<211> 268

<212> PRT

<213> *Thermus thermophilus*

<400> 156

Met Ala Leu His Pro Ala His Pro Gly Ala Ile Ile Gly His Glu Ala
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Val Leu Ala Leu Leu Pro Arg Leu Thr Ala Gln Thr Leu Leu Phe Ser
20 25 30

Gly Pro Glu Gly Val Gly Arg Arg Thr Val Ala Arg Trp Tyr Ala Trp
35 40 45

Gly Leu Asn Arg Gly Phe Pro Pro Pro Ser Leu Gly Glu His Pro Asp
 50 55 60
 Val Leu Glu Val Gly Pro Lys Ala Arg Asp Leu Arg Gly Arg Ala Glu
 65 70 75 80
 Val Arg Leu Glu Glu Val Ala Pro Leu Leu Glu Trp Cys Ser Ser His
 85 90 95
 Pro Arg Glu Arg Val Lys Val Ala Ile Leu Asp Ser Ala His Leu Leu
 100 105 110
 Thr Glu Ala Ala Ala Asn Ala Leu Leu Lys Leu Leu Glu Glu Pro Pro
 115 120 125
 Ser Tyr Ala Arg Ile Val Leu Ile Ala Pro Ser Arg Ala Thr Leu Leu
 130 135 140
 Pro Thr Leu Ala Ser Arg Ala Thr Glu Val Ala Phe Ala Pro Val Pro
 145 150 155 160
 Glu Glu Ala Leu Arg Ala Leu Thr Gln Asp Pro Glu Leu Leu Arg Tyr
 165 170 175
 Ala Ala Gly Ala Pro Gly Arg Leu Leu Arg Ala Leu Gln Asp Pro Glu
 180 185 190
 Gly Tyr Arg Ala Arg Met Ala Arg Ala Gln Arg Val Leu Lys Ala Pro
 195 200 205
 Pro Leu Glu Arg Leu Ala Leu Leu Arg Glu Leu Leu Ala Glu Glu Glu
 210 215 220
 Gly Val His Ala Leu His Ala Val Leu Lys Arg Pro Glu His Leu Leu
 225 230 235 240
 Ala Leu Glu Arg Ala Arg Glu Ala Leu Glu Gly Tyr Val Ser Pro Glu
 245 250 255
 Leu Val Leu Ala Arg Leu Ala Leu Asp Leu Glu Thr
 260 265

<210> 157

<211> 729

<212> DNA

<213> Thermus thermophilus

<400> 157

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agcgtgcccc agggcgctcc cgtcctcctc ctggacccta agccaagccc ctcccgggcg 120
gccttctacc ggaaccggga aaggcgggac tccccaccc ccaaggggaa ggacctggtg 180
cggcacctgg aaaaccgggc caagcgctg gggctcaggc tcccgggcg ggtggcccag 240
tacctggcct ccctggaggg ggacctcgag gccctggagc gggagctgga gaagcttgcc 300
ctcctctccc caccctcac cctggagaag gtggagaagg tgggtggccct gaggcccccc 360
ctcacgggct ttgacctggt gcgctccgtc ctggagaagg accccaagga ggccctcctg 420
cgcctaggcg gcctcaagga ggagggggag gagccctca ggctcctcg ggccctctcc 480
tggcagttcg ccctcctcgc cggggccttc ttcctcctcc gggaaaaccc caggcccaag 540
gaggaggacc tcgcccgcct cgaggccac ccctacgcc cccgccgcgc cctggaggcg 600
gcgaagcgcc tcacggaaga ggccctcaag gaggccctg acgccctcat ggaggcgga 660
aagagggcca agggggggaa agaccggtg ctcgccctg aggcggcggt cctccgcctc 720
gcccgttga 729

<210> 158

<211> 292

<212> PRT

<213> *Thermus thermophilus*

<400> 158

Met Val Ile Ala Phe Thr Gly Asp Pro Phe Leu Ala Arg Glu Ala Leu
1 5 10 15
Leu Glu Glu Ala Arg Leu Arg Gly Leu Ser Arg Phe Thr Glu Pro Thr
20 25 30
Pro Glu Ala Leu Ala Gln Ala Leu Ala Pro Gly Leu Phe Gly Gly Gly
35 40 45
Gly Ala Met Leu Asp Leu Arg Glu Val Gly Glu Ala Glu Trp Lys Ala
50 55 60
Leu Lys Pro Leu Leu Glu Ser Val Pro Glu Gly Val Pro Val Leu Leu
65 70 75 80
Leu Asp Pro Lys Pro Ser Pro Ser Arg Ala Ala Phe Tyr Arg Asn Arg
85 90 95
Glu Arg Arg Asp Phe Pro Thr Pro Lys Gly Lys Asp Leu Val Arg His
100 105 110
Leu Glu Asn Arg Ala Lys Arg Leu Gly Leu Arg Leu Pro Gly Gly Val
115 120 125
Ala Gln Tyr Leu Ala Ser Leu Glu Gly Asp Leu Glu Ala Leu Glu Arg
130 135 140

Glu Leu Glu Lys Leu Ala Leu Leu Ser Pro Pro Leu Thr Leu Glu Lys
 145 150 155 160
 Val Glu Lys Val Val Ala Leu Arg Pro Pro Leu Thr Gly Phe Asp Leu
 165 170 175
 Val Arg Ser Val Leu Glu Lys Asp Pro Lys Glu Ala Leu Leu Arg Leu
 180 185 190
 Gly Gly Leu Lys Glu Glu Gly Glu Glu Pro Leu Arg Leu Leu Gly Ala
 195 200 205
 Leu Ser Trp Gln Phe Ala Leu Leu Ala Arg Ala Phe Phe Leu Leu Arg
 210 215 220
 Glu Asn Pro Arg Pro Lys Glu Glu Asp Leu Ala Arg Leu Glu Ala His
 225 230 235 240
 Pro Tyr Ala Ala Arg Arg Ala Leu Glu Ala Ala Lys Arg Leu Thr Glu
 245 250 255
 Glu Ala Leu Lys Glu Ala Leu Asp Ala Leu Met Glu Ala Glu Lys Arg
 260 265 270
 Ala Lys Gly Gly Lys Asp Pro Trp Leu Ala Leu Glu Ala Ala Val Leu
 275 280 285
 Arg Leu Ala Arg
 290

<210> 159

<211> 37

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer

<400> 159

gtgtgtcata tgagtaagga tttcgtccac cttcacc

37

<210> 160

<211> 34

<212> DNA

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 160
gtgtgtggat ccggggacta ctcggaagta aggg 34

<210> 161
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 161
gtgtgtcata tggaaaccac aatattccag ttccag 36

<210> 162
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 162
gtgtgtggat cttatccac catgagaagt atttttcac 39

<210> 163
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 163
gtgtgtcata tggaaaaagt tttttttgga aaaaactcca g 41

<210> 164
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 164
gtgtgtggat ccttaatccg cctgaacggc taacg 35

<210> 165
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 165
gtgtgtcata tgaactacgt tcccttcgcg agaaagtaca g 41

<210> 166
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 166
gtgtgtggat ccttaaaaca gcctcgcccc gctgga 36

<210> 167
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 167
gtgtgtcata tgcgcgttaa ggtggacagg gag 33

<210> 168
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 168
tgtgtctcga gtcattggcta caccctcatc ggcat 35

<210> 169
<211> 47
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 169
gtgtgtcata tgctcaataa gggtttttata ataggaagac ttacggg 47

<210> 170
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 170
gtgtgggatcc ttaaaaaggt atttcgtcct cttcatcgg 39

<210> 171
<211> 807
<212> DNA
<213> *Thermus thermophilus*

<400> 171
atggctcag gcctgaaccg cgttttcttc atcggcgccc tcgccaccgc gccggacatg 60
cgctacaccc cggcgggggt cgccattttg gacctgaccc tcgccgggtca ggacctgctt 120
ctttccgata acggggggga accggagggtg tcctgggtacc accgggtgag gctcttaggc 180
cgccaggcgg agatgtgggg cgacctcttg gaccaagggc agctcgtctt cgtggagggc 240
cgcttgaggt accgccagt ggaaaggagg ggggagaagc ggagcgagct ccagatccgg 300
gccgacttcc ggacccccct gacgaccggg ggaagaagcg ggcggaggac agccggggcc 360
agcccaggct ccgcgcgcgc ctgaaccagg tcttcctcat gggcaacctg acccggggacc 420
cggaactccg ctacaccccc cagggcaccg cgggtggccc gctgggcctg gcggtgaacg 480
agcgcggcca gggggcggag gagcgacccc acttcgtgga gggttcaggcc tggcgcgacc 540
tggcggagtg ggccgccgag ctgaggaagg gcgacggcct tttcgtgatc ggcaggttgg 600

tgaacgactc ctggaccagc tccagcggcg agcggcgctt ccagaccggt gtggaggccc 660
 tcaggctgga gcgccccacc cgtggacctg cccaggcctg cccaggccgg cggaacaggt 720
 cccgcgaagt ccagacgggt ggggtggaca ttgacgaagg cttggaagac tttccgccgg 780
 aggaggattt gccgttttga gcacgaa 807

<210> 172

<211> 266

<212> PRT

<213> Thermus thermophilus

<400> 172

Met Ala Arg Gly Leu Asn Arg Val Phe Leu Ile Gly Ala Leu Ala Thr
 1 5 10 15

Arg Pro Asp Met Arg Tyr Thr Pro Ala Gly Leu Ala Ile Leu Asp Leu
 20 25 30

Thr Leu Ala Gly Gln Asp Leu Leu Leu Ser Asp Asn Gly Gly Glu Pro
 35 40 45

Glu Val Ser Trp Tyr His Arg Val Arg Leu Leu Gly Arg Gln Ala Glu
 50 55 60

Met Trp Gly Asp Leu Leu Asp Gln Gly Gln Leu Val Phe Val Glu Gly
 65 70 75 80

Arg Leu Glu Tyr Arg Gln Trp Glu Arg Glu Gly Glu Lys Arg Ser Glu
 85 90 95

Leu Gln Ile Arg Ala Asp Phe Leu Asp Pro Leu Asp Asp Arg Gly Lys
 100 105 110

Lys Arg Ala Glu Asp Ser Arg Gly Gln Pro Arg Leu Arg Ala Ala Leu
 115 120 125

Asn Gln Val Phe Leu Met Gly Asn Leu Thr Arg Asp Pro Glu Leu Arg
 130 135 140

Tyr Thr Pro Gln Gly Thr Ala Val Ala Arg Leu Gly Leu Ala Val Asn
 145 150 155 160

Glu Arg Arg Gln Gly Ala Glu Glu Arg Thr His Phe Val Glu Val Gln
 165 170 175

Ala Trp Arg Asp Leu Ala Glu Trp Ala Ala Glu Leu Arg Lys Gly Asp
 180 185 190

Gly Leu Phe Val Ile Gly Arg Leu Val Asn Asp Ser Trp Thr Ser Ser
 195 200 205

Ser Gly Glu Arg Arg Phe Gln Thr Arg Val Glu Ala Leu Arg Leu Glu
 210 215 220

Arg Pro Thr Arg Gly Pro Ala Gln Ala Cys Pro Gly Arg Arg Asn Arg
 225 230 235 240

Ser Arg Glu Val Gln Thr Gly Gly Val Asp Ile Asp Glu Gly Leu Glu
 245 250 255

Asp Phe Pro Pro Glu Glu Asp Leu Pro Phe
 260 265

<210> 173

<211> 992

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 173

aattccgaca tttcaattga atcgtttatt ccgcttgaaa aagaaggcaa gttgctcggt 60
 gatgtgaaaa gaccggggag catcgtagct caggcgcgct ttttctctga aatcgtgaaa 120
 aaactgccgc aacaaacggt ggaaatcgaa acggaagaca actttttgac gatcatccgc 180
 tcggggcact cagaattccg cctcaatggg ctaaacgccg acgaatatcc gcgcctgccg 240
 caaattgaag aagaaaacgt gtttcaaadc ccggctgatt tattgaaaac cgtgattcgg 300
 caaacggtgt tcgccgtttc tacatcgga acgcgcccaa tcttgacagg tgtcaactgg 360
 aaagtgaac atggcgagct tgtctgcaca gcgaccgaca gtcacgctt agccatgcgc 420
 aaagtgaana ttgagtcgga aaatgaagta tcatacaacg tcgtcatccc tggaaaaagt 480
 cttaatgagc tcagcaaaat tttggatgac ggcaaccacc cggaggacat cgtcatgaca 540
 gccaatcaag tgctatttaa ggccgagcac cttctcttct tttcccggt gcttgacggc 600
 aactatccgg agacggcccc cttgattcca acagaaagca aaacgaccat gatcgtcaat 660
 gcaaaagagt ttctgcaggc aatcgaccga gcgtccttgc ttgctcgaga aggaaggaa 720
 aacgtttgta aactgacgac gcttccttga ggaatgctcg aaatttcttc gatttctccg 780
 agatcgggaa agtgacggag cagctgcaaa cggagtctct tgaaggggaa gagttgaaca 840
 tttcgttcag cgcgaaatat atgatggacg cgttgccggc gcttgatgga acagacattt 900
 caaatcagct tcaactggggc catgcggccg ttccgtgttc gcccgcttca accgattcga 960
 tgcttcagct cattttgccg gtgagaacat at 992

<210> 174

<211> 334

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 174

Asn Ser Asp Ile Ser Ile Ile Glu Ser Phe Ile Pro Leu Glu Lys Glu

1	5	10	15
Gly Lys Leu Leu Val Asp Val Lys Arg Pro Gly Ser Ile Val Leu Gln	20	25	30
Ala Arg Phe Phe Ser Glu Ile Val Lys Lys Leu Pro Gln Gln Thr Val	35	40	45
Glu Ile Glu Thr Glu Asp Asn Phe Leu Thr Ile Ile Arg Ser Gly His	50	55	60
Ser Glu Phe Arg Leu Asn Gly Leu Asn Ala Asp Glu Tyr Pro Arg Leu	65	70	75
Pro Gln Ile Glu Glu Glu Asn Val Phe Gln Ile Pro Ala Asp Leu Leu	85	90	95
Lys Thr Val Ile Arg Gln Thr Val Phe Ala Val Ser Thr Ser Glu Thr	100	105	110
Arg Pro Ile Leu Thr Gly Val Asn Trp Lys Val Glu His Gly Glu Leu	115	120	125
Val Cys Thr Ala Thr Asp Ser His Arg Leu Ala Met Arg Lys Val Lys	130	135	140
Ile Ile Glu Ser Glu Asn Glu Val Ser Tyr Asn Val Val Ile Pro Gly	145	150	155
Lys Ser Leu Asn Glu Leu Ser Lys Ile Ile Leu Asp Asp Gly Asn His	165	170	175
Pro Val Asp Ile Val Met Thr Ala Asn Gln Val Leu Phe Lys Ala Glu	180	185	190
His Leu Leu Phe Phe Ser Arg Leu Leu Asp Gly Asn Tyr Pro Glu Thr	195	200	205
Ala Arg Leu Ile Pro Thr Glu Ser Lys Thr Thr Met Ile Val Asn Ala	210	215	220
Lys Glu Phe Leu Gln Ala Ile Asp Arg Ala Ser Leu Leu Ala Arg Glu	225	230	235
Gly Arg Asn Asn Val Val Lys Leu Thr Thr Leu Pro Gly Gly Met Leu	245	250	255
Glu Ile Ser Ser Ile Ser Pro Glu Ile Gly Lys Val Thr Glu Gln Leu			

260 265 270

Gln Thr Glu Ser Leu Glu Gly Glu Glu Leu Asn Ile Ser Phe Ser Ala
 275 280 285

Lys Tyr Met Met Asp Ala Leu Arg Ala Leu Asp Gly Thr Asp Ile Gln
 290 295 300

Ile Ser Phe Thr Gly Ala Met Arg Pro Phe Leu Leu Arg Pro Leu His
 305 310 315 320

Thr Asp Ser Met Leu Gln Leu Ile Leu Pro Val Arg Thr Tyr
 325 330

<210> 175

<211> 492

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 175

atgattaacc gcgtcatttt ggtcggcagg ttaacgagag atccggagtt gcgttacact 60
 ccaagcggag tggctgttgc cacgtttacg ctgcgggtca accgtccgtt tacaaatcag 120
 cagggcgagc gggaaacgga ttttattcaa tgtgtcgttt gccgccgcca ggcggaaaac 180
 gtcgccaact ttttgaaaaa ggggagcttg gctggtgtcg atggccgact gcaaaccgcg 240
 agctatgaaa atcaagaagg tcggcggtgtg tacgtgacgg aagtgggtggc tgatagcgtc 300
 caatttcttg agccgaaagg aacgagcgag cagcgagggg cgacagcagg cggctactat 360
 ggggatccat tcccatcgg gcaagatcag aaccaccaat atccgaacga aaaagggttt 420
 ggccgcacg atgacgatcc tttcgccaat gacggccagc cgatcgatat ttctgatgat 480
 gatttgccgt tt 492

<210> 176

<211> 164

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 176

Met Ile Asn Arg Val Ile Leu Val Gly Arg Leu Thr Arg Asp Pro Glu
 1 5 10 15

Leu Arg Tyr Thr Pro Ser Gly Val Ala Val Ala Thr Phe Thr Leu Ala
 20 25 30

Val Asn Arg Pro Phe Thr Asn Gln Ser Tyr Glu Asn Gln Glu Gly Arg
 35 40 45

Arg Val Tyr Val Thr Glu Val Val Ala Asp Ser Val Gln Phe Leu Glu

50

55

60

Pro Lys Gly Thr Ser Glu Gln Arg Gly Ala Thr Ala Gly Gly Tyr Tyr
65 70 75 80

Gln Gly Glu Arg Glu Thr Asp Phe Ile Gln Cys Val Val Trp Arg Arg
85 90 95

Gln Ala Glu Asn Val Ala Asn Phe Leu Lys Lys Gly Ser Leu Ala Gly
100 105 110

Val Asp Gly Arg Leu Gln Thr Arg Gly Asp Pro Phe Pro Phe Gly Gln
115 120 125

Asp Gln Asn His Gln Tyr Pro Asn Glu Lys Gly Phe Gly Arg Ile Asp
130 135 140

Asp Asp Pro Phe Ala Asn Asp Gly Gln Pro Ile Asp Ile Ser Asp Asp
145 150 155 160

Asp Leu Pro Phe

<210> 177

<211> 1044

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 177

atgctggaac gcgtatgggg aaacattgaa aaacggcggt tttctcccct ttatttatta 60
tacggcaatg agccgttttt attaacggaa acgtatgagc gattggtgaa cgcagcgctt 120
ggccccgagg agcgggagtg gaacttggct gtgtacgact gcgaggaaac gccgatcgag 180
gcggcgcttg aggaggccga gacggtgccg tttttcggcg agcggcgtgt cattctcatc 240
aagcatccat atttttttac gtctgaaaaa gagaaggaga tcgaacatga tttggcgaag 300
ctggaggcgt acttgaaggc gccgtcgccg ttttcgatcg tcgtcttttt cgcgccgtac 360
gagaagcttg atgagcgaaa aaaaattacg aagctcgcca aagagcaaag cgaagtcgtc 420
atcgccgccc cgctcgccga agcggagctg cgtgcctggg tcggcgccg catcgagagc 480
caagggggcgc aagcaagcga cgaggcgatt gatgtcctgt tcggcggggc cgggacgcag 540
ctttccgcct tggcgaatga aatcgataaa ttggccctgt ttgccggatc gggcggaacc 600
atcgaggcgg cggcggttga gcggtctgtc gcccgcacgc cggaagaaaa cgtattttgtg 660
cttgtcgagc aagtggcgaa gcgcgacatt ccagcagcgt tcgagacgtt ttatgatctg 720
cttgaaaaca atgaagagcc gatcaaaatt ttggcggttg tcgccgcca tttccgcttg 780
ctttcgcaag tgaaatggct tgctcctta ggctacggac aggcgcaa at tgctgctggc 840
ctcaaggtgc acccgttccg cgtcaagctc gctcttgctc aagcggcccc cttcgtgac 900
ggagagcttg ctgaggcgat caacgagctc gctgacgccg attacgaagt gaaaagcggg 960
gcggtcgatc gccggttgcc cgttgagctg cttctgatgc gctggggcgc ccgccggcg 1020
caagcggggc gccacggccg gcgg 1044

<210> 178

<211> 348

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 178

Met Leu Glu Arg Val Trp Gly Asn Ile Glu Lys Arg Arg Phe Ser Pro
1 5 10 15

Leu Tyr Leu Leu Tyr Gly Asn Glu Pro Phe Leu Leu Thr Glu Thr Tyr
20 25 30

Glu Arg Leu Val Asn Ala Ala Leu Gly Pro Glu Glu Arg Glu Trp Asn
35 40 45

Leu Ala Val Tyr Asp Cys Glu Glu Thr Pro Ile Glu Ala Ala Leu Glu
50 55 60

Glu Ala Glu Thr Val Pro Phe Phe Gly Glu Arg Arg Val Ile Leu Ile
65 70 75 80

Lys His Pro Tyr Phe Phe Thr Ser Glu Lys Glu Lys Glu Ile Glu His
85 90 95

Asp Leu Ala Lys Leu Glu Ala Tyr Leu Lys Ala Pro Ser Pro Phe Ser
100 105 110

Ile Val Val Phe Phe Ala Pro Tyr Glu Lys Leu Asp Glu Arg Lys Lys
115 120 125

Ile Thr Lys Leu Ala Lys Glu Gln Ser Glu Val Val Ile Ala Ala Pro
130 135 140

Leu Ala Glu Ala Glu Leu Arg Ala Trp Val Arg Arg Arg Ile Glu Ser
145 150 155 160

Gln Gly Ala Gln Ala Ser Asp Glu Ala Ile Asp Val Leu Leu Arg Arg
165 170 175

Ala Gly Thr Gln Leu Ser Ala Leu Ala Asn Glu Ile Asp Lys Leu Ala
180 185 190

Leu Phe Ala Gly Ser Gly Gly Thr Ile Glu Ala Ala Ala Val Glu Arg
195 200 205

Leu Val Ala Arg Thr Pro Glu Glu Asn Val Phe Val Leu Val Glu Gln

210	215	220
Val Ala Lys Arg Asp Ile Pro Ala Ala Leu Gln Thr Phe Tyr Asp Leu		
225	230	235 240
Leu Glu Asn Asn Glu Glu Pro Ile Lys Ile Leu Ala Leu Leu Ala Ala		
	245	250 255
His Phe Arg Leu Leu Ser Gln Val Lys Trp Leu Ala Ser Leu Gly Tyr		
	260	265 270
Gly Gln Ala Gln Ile Ala Ala Ala Leu Lys Val His Pro Phe Arg Val		
	275	280 285
Lys Leu Ala Leu Ala Gln Ala Ala Arg Phe Ala Asp Gly Glu Leu Ala		
	290	295 300
Glu Ala Ile Asn Glu Leu Ala Asp Ala Asp Tyr Glu Val Lys Ser Gly		
305	310	315 320
Ala Val Asp Arg Arg Leu Ala Val Glu Leu Leu Leu Met Arg Trp Gly		
	325	330 335
Ala Arg Pro Ala Gln Ala Gly Arg His Gly Arg Arg		
	340	345

<210> 179

<211> 757

<212> DNA

<213> Bacillus stearothermophilus

<400> 179

atgcgatggg	aacagctagc	gaaacgccag	ccggtggtgg	cgaaaatgct	gcaaagcggc	60
ttggaaaaag	ggcggatttc	tcatgcgtac	ttgtttgagg	ggcagcgggg	gacgggcaaa	120
aaagcggcca	gtttgttggt	ggcgaaacgt	ttgttttgct	tgtccccaat	cggagtttcc	180
ccgtgtctag	agtgccgcaa	ctgccggcgc	atcgactccg	gcaaccaccc	tgacgtccgg	240
gtgatcggcc	cagatggagg	atcaatcaaa	aaggaacaaa	tcgaatggct	gcagcaagag	300
ttctcgaaaa	cagcgggtcg	gtcggataaa	aaaatgtaca	tcgttgagca	cgccgatcaa	360
atgacgacaa	gcgctgccaa	cagccttctg	aaatTTTTTg	aagagccgca	tccggggacg	420
gtggcggtat	tgctgactga	gcaataccac	cgccctgctag	ggacgatcgt	ttcccgctgt	480
caagtgcctt	cgttccggcc	gttgccgcgc	gcagagctcg	cccagggact	tgctcaggag	540
cacgtgccgt	tgccgttggc	gctgttggtg	gcccatttga	caaacagctt	cgaggaagca	600
ctggcgcttg	ccaaagatag	ttggtttgcc	gaggcgcgaa	cattagtgtg	acaatggtat	660
gagatgctgg	gcaagccgga	gctgcagctt	ttgtttttca	tccacgaccg	cttgttttccg	720
catttttttg	aaagccatca	gcttgacctt	ggacttgg			757

<210> 180
 <211> 252
 <212> PRT
 <213> *Bacillus stearothermophilus*

<400> 180

Met Arg Trp Glu Gln Leu Ala Lys Arg Gln Pro Val Val Ala Lys Met
 1 5 10 15

Leu Gln Ser Gly Leu Glu Lys Gly Arg Ile Ser His Ala Tyr Leu Phe
 20 25 30

Glu Gly Gln Arg Gly Thr Gly Lys Lys Ala Ala Ser Leu Leu Leu Ala
 35 40 45

Lys Arg Leu Phe Cys Leu Ser Pro Ile Gly Val Ser Pro Cys Leu Glu
 50 55 60

Cys Arg Asn Cys Arg Arg Ile Asp Ser Gly Asn His Pro Asp Val Arg
 65 70 75 80

Val Ile Gly Pro Asp Gly Gly Ser Ile Lys Lys Glu Gln Ile Glu Trp
 85 90 95

Leu Gln Gln Glu Phe Ser Lys Thr Ala Val Glu Ser Asp Lys Lys Met
 100 105 110

Tyr Ile Val Glu His Ala Asp Gln Met Thr Thr Ser Ala Ala Asn Ser
 115 120 125

Leu Leu Lys Phe Leu Glu Glu Pro His Pro Gly Thr Val Ala Val Leu
 130 135 140

Leu Thr Glu Gln Tyr His Arg Leu Leu Gly Thr Ile Val Ser Arg Cys
 145 150 155 160

Gln Val Leu Ser Phe Arg Pro Leu Pro Pro Ala Glu Leu Ala Gln Gly
 165 170 175

Leu Val Glu Glu His Val Pro Leu Pro Leu Ala Leu Leu Ala Ala His
 180 185 190

Leu Thr Asn Ser Phe Glu Glu Ala Leu Ala Leu Ala Lys Asp Ser Trp
 195 200 205

Phe Ala Glu Ala Arg Thr Leu Val Leu Gln Trp Tyr Glu Met Leu Gly
 210 215 220

Lys Pro Glu Leu Gln Leu Leu Phe Phe Ile His Asp Arg Leu Phe Pro
 225 230 235 240

His Phe Leu Glu Ser His Gln Leu Asp Leu Gly Leu
 245 250

<210> 181

<211> 1677

<212> DNA

<213> *Bacillus stearothermophilus*

<400> 181

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caagaacacg tgaccaagac gttgcaaagc gccctgcttc aacataaaat atcgcacgct 120
tacttatttt ccggcccgcg cgggtacagga aaaacgagcg cagcgaaaat ttctgccaag 180
gcggtcaact gtgaacaggc gccagcggcg gagccatgca atgagtgtcc agcttgcttc 240
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aaagtgtata tcatcgacga ggtgcatatg ctgtcgatcg gtgcgtttaa cgcgctgttg 420
aaaacgttgg aggagccgcc gaaacacgct attttcattt tggccacgac cgagccgcac 480
aaaattccgg cgacgatcat ttcccgtgct caacggttcg attttcgccg catcccgtt 540
caggcgatcg ttacacggct aaagtacgct gcaagcgccc aagggtgtcg ggctcagat 600
gaggcattgt ccgccatcgc ccgtgctgca gacgggggga tgcgcgatgc gctcagcttg 660
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gcgccggtga aaaaactgtc caaaccgatg aaaacggggg gatataaagc cccggttggc 1260
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caagagagcg agccggttgc agcagcgccc tcagcgtttg tattaataatt caaatacgaa 1440
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ttgtttgagc tgacaaaccg ccgctttgaa atggtagcca ttccggaggg agaattggga 1560
aaaataagag aagagttcat ccgcaataag gacgccatgg tggaaaaaag cgaagaagat 1620
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<210> 182

<211> 559

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 182

Val Ala Tyr Gln Ala Leu Tyr Arg Val Phe Arg Pro Gln Arg Phe Ala
1 5 10 15

Asp Met Val Gly Gln Glu His Val Thr Lys Thr Leu Gln Ser Ala Leu
20 25 30

Leu Gln His Lys Ile Ser His Ala Tyr Leu Phe Ser Gly Pro Arg Gly
35 40 45

Thr Gly Lys Thr Ser Ala Ala Lys Ile Phe Ala Lys Ala Val Asn Cys
50 55 60

Glu Gln Ala Pro Ala Ala Glu Pro Cys Asn Glu Cys Pro Ala Cys Leu
65 70 75 80

Gly Ile Thr Asn Gly Thr Val Pro Asp Val Leu Glu Ile Asp Ala Ala
85 90 95

Ser Asn Asn Arg Val Asp Glu Ile Arg Asp Ile Arg Glu Lys Val Lys
100 105 110

Phe Ala Pro Thr Ser Ala Arg Tyr Lys Val Tyr Ile Ile Asp Glu Val
115 120 125

His Met Leu Ser Ile Gly Ala Phe Asn Ala Leu Leu Lys Thr Leu Glu
130 135 140

Glu Pro Pro Lys His Val Ile Phe Ile Leu Ala Thr Thr Glu Pro His
145 150 155 160

Lys Ile Pro Ala Thr Ile Ile Ser Arg Cys Gln Arg Phe Asp Phe Arg
165 170 175

Arg Ile Pro Leu Gln Ala Ile Val Ser Arg Leu Lys Tyr Val Ala Ser
180 185 190

Ala Gln Gly Val Glu Ala Ser Asp Glu Ala Leu Ser Ala Ile Ala Arg
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Ala Ala Asp Gly Gly Met Arg Asp Ala Leu Ser Leu Leu Asp Gln Ala
210 215 220

Ile Ser Phe Ser Asp Gly Lys Leu Arg Leu Asp Asp Val Leu Ala Met
225 230 235 240

Thr Gly Ala Ala Ser Phe Ala Ala Leu Ser Ser Phe Ile Glu Ala Ile
245 250 255

His Arg Lys Asp Thr Ala Ala Val Leu Gln His Leu Glu Thr Met Met
 260 265 270
 Ala Gln Gly Lys Asp Pro His Arg Leu Val Glu Asp Leu Ile Leu Tyr
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 Tyr Arg Asp Leu Leu Leu Tyr Lys Thr Ala Pro Tyr Val Glu Gly Ala
 290 295 300
 Ile Gln Ile Ala Val Val Asp Glu Ala Phe Thr Ser Leu Ser Glu Met
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 Ile Pro Val Ser Asn Leu Tyr Glu Ala Ile Glu Leu Leu Asn Lys Ser
 325 330 335
 Gln Gln Glu Met Lys Trp Thr Asn His Pro Arg Leu Leu Leu Glu Val
 340 345 350
 Ala Leu Val Lys Leu Cys His Pro Ser Ala Ala Ala Pro Ser Leu Ser
 355 360 365
 Ala Ser Glu Leu Glu Pro Leu Ile Lys Arg Ile Glu Thr Leu Glu Ala
 370 375 380
 Glu Leu Arg Arg Leu Lys Glu Gln Pro Pro Ala Pro Pro Ser Thr Ala
 385 390 395 400
 Ala Pro Val Lys Lys Leu Ser Lys Pro Met Lys Thr Gly Gly Tyr Lys
 405 410 415
 Ala Pro Val Gly Arg Ile Tyr Glu Leu Leu Lys Gln Ala Thr His Glu
 420 425 430
 Asp Leu Ala Leu Val Lys Gly Cys Trp Ala Asp Val Leu Asp Thr Leu
 435 440 445
 Lys Arg Gln His Lys Val Ser His Ala Ala Leu Leu Gln Glu Ser Glu
 450 455 460
 Pro Val Ala Ala Ser Ala Ser Ala Phe Val Leu Lys Phe Lys Tyr Glu
 465 470 475 480
 Ile His Cys Lys Met Ala Thr Asp Pro Thr Ser Ser Val Lys Glu Asn
 485 490 495
 Val Glu Ala Ile Leu Phe Glu Leu Thr Asn Arg Arg Phe Glu Met Val
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Ala Ile Pro Glu Gly Glu Trp Gly Lys Ile Arg Glu Glu Phe Ile Arg
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Asn Lys Asp Ala Met Val Glu Lys Ser Glu Glu Asp Pro Leu Ile Ala
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Glu Ala Lys Arg Leu Phe Gly Glu Glu Leu Ile Glu Ile Lys Glu
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<210> 183

<211> 4301

<212> DNA

<213> Bacillus stearothermophilus

<400> 183

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<210> 184

<211> 1433

<212> PRT

<213> *Bacillus stearothermophilus*

<400> 184

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			20					25					30			
Ile	Arg	Lys	Val	Val	Ile	Asp	Lys	Glu	Glu	Lys	Ser	Trp	His	Phe	Tyr	
		35					40					45				
Phe	Gln	Phe	Asp	Asn	Val	Leu	Pro	Val	His	Val	Tyr	Lys	Thr	Phe	Ala	
	50					55					60					
Asp	Arg	Leu	Gln	Thr	Ala	Phe	Arg	His	Ile	Ala	Ala	Val	Arg	His	Thr	
65					70					75					80	
Met	Glu	Val	Glu	Ala	Pro	Arg	Val	Thr	Glu	Ala	Asp	Val	Gln	Ala	Tyr	
				85					90					95		
Trp	Pro	Leu	Cys	Leu	Ala	Glu	Leu	Gln	Glu	Gly	Met	Ser	Pro	Leu	Val	
		100						105					110			
Asp	Trp	Leu	Ser	Arg	Gln	Thr	Pro	Glu	Leu	Lys	Gly	Asn	Lys	Leu	Leu	
		115					120					125				
Val	Val	Ala	Arg	His	Glu	Ala	Glu	Ala	Leu	Ala	Ile	Lys	Arg	Arg	Phe	
	130					135					140					
Ala	Lys	Lys	Ile	Ala	Asp	Val	Tyr	Ala	Ser	Phe	Gly	Phe	Pro	Pro	Leu	
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Gln	Leu	Asp	Val	Ser	Val	Glu	Pro	Ser	Lys	Gln	Glu	Met	Glu	Gln	Phe	
				165					170					175		
Leu	Ala	Gln	Lys	Gln	Gln	Glu	Asp	Glu	Glu	Arg	Ala	Leu	Ala	Val	Leu	
			180					185					190			
Thr	Asp	Leu	Ala	Arg	Glu	Glu	Glu	Lys	Ala	Ala	Ser	Ala	Pro	Pro	Ser	
		195						200				205				
Gly	Pro	Leu	Val	Ile	Gly	Tyr	Pro	Ile	Arg	Asp	Glu	Glu	Pro	Val	Arg	
	210					215					220					
Arg	Leu	Glu	Thr	Ile	Val	Glu	Glu	Glu	Arg	Arg	Val	Val	Val	Gln	Gly	
225					230				235					240		
Tyr	Val	Phe	Asp	Ala	Glu	Val	Ser	Glu	Leu	Lys	Ser	Gly	Arg	Thr	Leu	
				245					250					255		

Leu Thr Met Lys Ile Thr Asp Tyr Thr Asn Ser Ile Leu Val Lys Met
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 Phe Ser Arg Asp Lys Glu Asp Ala Glu Leu Met Ser Gly Val Lys Lys
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 Gly Met Trp Val Lys Val Arg Gly Ser Val Gln Asn Asp Thr Phe Val
 290 295 300
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 Glu Arg Gln Asp Thr Ala Pro Glu Gly Glu Lys Arg Val Glu Leu His
 325 330 335
 Leu His Thr Pro Met Ser Gln Met Asp Ala Val Thr Ser Val Thr Lys
 340 345 350
 Leu Ile Glu Gln Ala Lys Lys Trp Gly His Pro Ala Ile Ala Val Thr
 355 360 365
 Asp His Ala Val Val Gln Ser Phe Pro Glu Ala Tyr Ser Ala Ala Lys
 370 375 380
 Lys His Gly Met Lys Val Ile Tyr Gly Leu Glu Ala Asn Ile Val Asp
 385 390 395 400
 Asp Gly Val Pro Ile Ala Tyr Asn Glu Thr His Arg Arg Leu Ser Glu
 405 410 415
 Glu Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser Ala Val
 420 425 430
 Tyr Asn Thr Ile Ile Glu Leu Ala Ala Val Lys Val Lys Asp Gly Glu
 435 440 445
 Ile Ile Asp Arg Phe Met Ser Phe Ala Asn Pro Gly His Pro Leu Ser
 450 455 460
 Val Thr Thr Met Glu Leu Thr Gly Ile Thr Asp Glu Met Val Lys Asp
 465 470 475 480
 Ala Pro Lys Pro Asp Glu Val Leu Ala Arg Phe Val Asp Trp Ala Gly
 485 490 495
 Asp Ala Thr Leu Val Ala His Asn Ala Ser Phe Asp Ile Gly Phe Leu
 500 505 510

Asn	Ala	Gly	Leu	Ala	Arg	Met	Gly	Arg	Gly	Lys	Ile	Ala	Asn	Pro	Val	515	520	525
Ile	Asp	Thr	Leu	Glu	Leu	Ala	Arg	Phe	Leu	Tyr	Pro	Asp	Leu	Lys	Asn	530	535	540
His	Arg	Leu	Asn	Thr	Leu	Cys	Lys	Lys	Phe	Asp	Ile	Glu	Leu	Thr	Gln	545	550	555
His	His	Arg	Ala	Ile	Tyr	Asp	Ala	Glu	Ala	Thr	Gly	His	Leu	Leu	Met	565	570	575
Arg	Leu	Leu	Lys	Glu	Ala	Glu	Glu	Arg	Gly	Ile	Leu	Phe	His	Asp	Glu	580	585	590
Leu	Asn	Ser	Arg	Thr	His	Ser	Glu	Ala	Ser	Tyr	Arg	Leu	Ala	Arg	Pro	595	600	605
Phe	His	Val	Thr	Leu	Leu	Ala	Gln	Asn	Glu	Thr	Gly	Leu	Lys	Asn	Leu	610	615	620
Phe	Lys	Leu	Val	Ser	Leu	Ser	His	Ile	Gln	Tyr	Phe	His	Arg	Val	Pro	625	630	635
Arg	Ile	Pro	Arg	Ser	Val	Leu	Val	Lys	His	Arg	Asp	Gly	Leu	Leu	Val	645	650	655
Gly	Ser	Gly	Cys	Asp	Lys	Gly	Glu	Leu	Phe	Asp	Asn	Leu	Ile	Gln	Lys	660	665	670
Ala	Pro	Glu	Glu	Val	Glu	Asp	Ile	Ala	Arg	Phe	Tyr	Asp	Phe	Leu	Glu	675	680	685
Val	His	Pro	Pro	Asp	Val	Tyr	Lys	Pro	Leu	Ile	Glu	Met	Asp	Tyr	Val	690	695	700
Lys	Asp	Glu	Glu	Met	Ile	Lys	Asn	Ile	Ile	Arg	Ser	Ile	Val	Ala	Leu	705	710	715
Gly	Glu	Lys	Leu	Asp	Ile	Pro	Val	Val	Ala	Thr	Gly	Asn	Val	His	Tyr	725	730	735
Leu	Asn	Pro	Glu	Asp	Lys	Ile	Tyr	Arg	Lys	Ile	Leu	Ile	His	Ser	Gln	740	745	750
Gly	Gly	Ala	Asn	Pro	Leu	Asn	Arg	His	Glu	Leu	Pro	Asp	Val	Tyr	Phe	755	760	765

Arg	Thr	Thr	Asn	Glu	Met	Leu	Asp	Cys	Phe	Ser	Phe	Leu	Gly	Pro	Glu	770	775	780	
Lys	Ala	Lys	Glu	Ile	Val	Val	Asp	Asn	Thr	Gln	Lys	Ile	Ala	Ser	Leu	785	790	795	800
Ile	Gly	Asp	Val	Lys	Pro	Ile	Lys	Asp	Glu	Leu	Tyr	Thr	Pro	Arg	Ile	805	810	815	
Glu	Gly	Ala	Asp	Glu	Glu	Ile	Arg	Glu	Met	Ser	Tyr	Arg	Arg	Ala	Lys	820	825	830	
Glu	Ile	Tyr	Gly	Asp	Pro	Leu	Pro	Lys	Leu	Val	Glu	Glu	Arg	Leu	Glu	835	840	845	
Lys	Glu	Leu	Lys	Ser	Ile	Ile	Gly	His	Gly	Phe	Ala	Val	Ile	Tyr	Leu	850	855	860	
Ile	Ser	His	Lys	Leu	Val	Lys	Lys	Ser	Leu	Asp	Asp	Gly	Tyr	Leu	Val	865	870	875	880
Gly	Ser	Arg	Gly	Ser	Val	Gly	Ser	Ser	Phe	Val	Ala	Thr	Met	Thr	Glu	885	890	895	
Ile	Thr	Glu	Val	Asn	Pro	Leu	Pro	Pro	His	Tyr	Val	Cys	Pro	Asn	Cys	900	905	910	
Lys	His	Ser	Glu	Phe	Phe	Asn	Asp	Gly	Ser	Val	Gly	Ser	Gly	Phe	Asp	915	920	925	
Leu	Pro	Asp	Lys	Asn	Cys	Pro	Arg	Cys	Gly	Thr	Lys	Tyr	Lys	Lys	Asp	930	935	940	
Gly	His	Asp	Ile	Pro	Phe	Glu	Thr	Phe	Leu	Gly	Phe	Lys	Gly	Asp	Lys	945	950	955	960
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His	Asn	Tyr	Thr	Lys	Val	Leu	Phe	Gly	Glu	Asp	Asn	Val	Tyr	Arg	Ala	980	985	990	
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Ala	Tyr	Ala	Ser	Asp	His	Asn	Leu	Glu	Leu	Arg	Gly	Ala	Glu	Ile	Asp	1010	1015	1020	

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Gly Gly Ile Ile Val Val Pro Asp Tyr Met Glu Ile Tyr Asp Phe Thr
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Pro Ile Gln Tyr Pro Ala Asp Asp Thr Ser Ser Glu Trp Arg Thr Thr
 1060 1065 1070

His Phe Asp Phe His Ser Ile His Asp Asn Leu Leu Lys Leu Asp Ile
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Leu Gly His Asp Asp Pro Thr Val Ile Arg Met Leu Gln Asp Leu Ser
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Gly Ile Asp Pro Lys Thr Ile Pro Thr Asp Asp Pro Asp Val Met Gly
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Ile Phe Ser Ser Thr Glu Pro Leu Gly Val Thr Pro Glu Gln Ile Met
 1125 1130 1135

Cys Asn Val Gly Thr Ile Gly Ile Pro Glu Phe Gly Thr Arg Phe Val
 1140 1145 1150

Arg Gln Met Leu Glu Glu Thr Arg Pro Lys Thr Phe Ser Glu Leu Val
 1155 1160 1165

Gln Ile Ser Gly Leu Ser His Gly Thr Asp Val Trp Leu Gly Asn Ala
 1170 1175 1180

Gln Glu Leu Ile Gln Asn Gly Thr Cys Thr Leu Ser Glu Val Ile Gly
 1185 1190 1195 1200

Cys Arg Asp Asp Ile Met Val Tyr Leu Ile Tyr Arg Gly Leu Glu Pro
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Ser Leu Ala Phe Lys Ile Met Glu Ser Val Arg Lys Gly Lys Gly Leu
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Thr Pro Glu Phe Glu Ala Glu Met Arg Lys His Asp Val Pro Glu Trp
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Tyr Ile Asp Ser Cys Lys Lys Ile Lys Tyr Met Phe Pro Lys Ala His
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Ala Ala Ala Tyr Val Leu Met Ala Val Arg Ile Ala Tyr Phe Lys Val
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His His Pro Leu Leu Tyr Tyr Ala Ser Tyr Phe Thr Val Arg Ala Glu
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Arg Ile Glu Glu Ile Asn Ala Lys Gly Ile Gln Ala Thr Ala Lys Glu
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Lys Ser Leu Leu Thr Val Leu Glu Val Ala Leu Glu Met Cys Glu Arg
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Gly Phe Ser Phe Lys Asn Ile Asp Leu Tyr Arg Ser Gln Ala Thr Glu
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Phe Val Ile Asp Gly Asn Ser Leu Ile Pro Pro Phe Asn Ala Ile Pro
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Gly Leu Gly Thr Asn Val Ala Gln Ala Ile Val Arg Ala Arg Glu Glu
1380 1385 1390

Gly Glu Phe Leu Ser Lys Glu Asp Leu Gln Gln Arg Gly Lys Leu Ser
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Pro Asp His Asn Gln Leu Ser Leu Phe
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<210> 185

<211> 199

<212> PRT

<213> Thermus thermophilus

<400> 185

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Leu Glu Gly Asp Leu Glu Ala Leu Glu Arg Glu Leu Glu Lys Leu Ala
35 40 45

Leu Leu Ser Pro Pro Leu Thr Leu Glu Lys Val Glu Lys Val Val Ala

50

55

60

Leu Arg Pro Pro Leu Thr Gly Phe Asp Leu Val Arg Ser Val Leu Glu
 65 70 75 80

Lys Asp Pro Lys Glu Ala Leu Leu Arg Leu Gly Arg Leu Lys Glu Glu
 85 90 95

Gly Glu Glu Pro Leu Arg Leu Leu Gly Ala Leu Ser Trp Gln Phe Ala
 100 105 110

Leu Leu Ala Arg Ala Phe Phe Leu Leu Arg Glu Met Pro Arg Pro Lys
 115 120 125

Glu Glu Asp Leu Ala Arg Leu Glu Ala His Pro Tyr Ala Ala Lys Lys
 130 135 140

Ala Leu Leu Glu Ala Ala Arg Arg Leu Thr Glu Glu Ala Leu Lys Glu
 145 150 155 160

Ala Leu Asp Ala Leu Met Glu Ala Glu Lys Arg Ala Lys Gly Gly Lys
 165 170 175

Asp Pro Trp Leu Ala Leu Glu Ala Ala Val Leu Arg Leu Ala Arg Pro
 180 185 190

Ala Gly Gln Pro Arg Val Asp
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<210> 186

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 186

gcccagttacc tcgcctccct cgagggg

27

<210> 187

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 187

ggcccccttg gccttctcgg cctccat

27

<210> 188

<211> 331

<212> DNA

<213> *Thermus thermophilus*

<400> 188

agactcgagg ccctggagcg ggagctggag aagcttgccc tcctctcccc acccctcacc 60
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cgctccgtcc tggagaagga ccccaaggag gccctcctgc gcctcaggcg cctcagggag 180
gagggggagg agccccctcag gctcctcggg gccctctcct ggcagttcgc cctcctcgcc 240
cgggccttct tcctcctcgg ggaaaacccc aggcccaagg aggaggacct cgcccgcctc 300
gagggcccacc cctacgccgc caagaaggcc a 331

<210> 189

<211> 110

<212> PRT

<213> *Thermus thermophilus*

<400> 189

Arg Leu Glu Ala Leu Glu Arg Glu Leu Glu Lys Leu Ala Leu Leu Ser
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Pro Pro Leu Thr Leu Glu Lys Val Glu Lys Val Val Ala Leu Arg Pro
20 25 30

Pro Leu Thr Gly Phe Asp Leu Val Arg Ser Val Leu Glu Lys Asp Pro
35 40 45

Lys Glu Ala Leu Leu Arg Leu Arg Arg Leu Arg Glu Glu Gly Glu Glu
50 55 60

Pro Leu Arg Leu Leu Gly Ala Leu Ser Trp Gln Phe Ala Leu Leu Ala
65 70 75 80

Arg Ala Phe Phe Leu Leu Arg Glu Asn Pro Arg Pro Lys Glu Glu Asp
85 90 95

Leu Ala Arg Leu Glu Ala His Pro Tyr Ala Ala Lys Lys Ala
100 105 110

<210> 190
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 190
gtggtgtcta gacatcataa cggttctggc a 31

<210> 191
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR Primer

<400> 191
gagggccacc accttctcca ccttctc 27

<210> 192
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR Primer

<400> 192
ctccgtcctg gagaaggacc ccaag 25

<210> 193
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<220>
<221> primer_bind
<222> (15)
<223> S at position 15 can be either C or G

<220>
 <221> primer_bind
 <222> (27)
 <223> S at position 27 can be either C or G

<400> 193
 cgcggaattca acgcsctcct caagacsct

29

<210> 194
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: PCR primer

<400> 194
 gacacttaac atatggtcat cgccttcacc g

31

<210> 195
 <211> 38
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: PCR primer

<400> 195
 gtgtgtgaat tcgggtcaac gggcgaggcg gaggaccg

38

<210> 196
 <211> 10
 <212> PRT
 <213> Deinococcus radiodurans

<400> 196
 Val Ile Leu Asn Pro Gly Ser Val Gly Gln
 1 5 10

<210> 197
 <211> 10
 <212> PRT
 <213> Methanococcus jannaschii

<400> 197

Tyr Leu Ile Asn Pro Gly Ser Val Gly Gln
1 5 10

<210> 198

<211> 10

<212> PRT

<213> *Thermotoga maritima*

<400> 198

Leu Val Leu Asn Pro Gly Ser Ala Gly Arg
1 5 10

<210> 199

<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 199

ctggtgaacc cgggctccgt gggccagc

28

<210> 200

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: polypeptide

<400> 200

Leu Leu Val Asn Pro Gly Ser Val Gly Gln
1 5 10

<210> 201

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 201
ctcgaggagc ttgaggaggg tgttggc

27

<210> 202
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: polypeptide

<400> 202
Ala Asn Thr Leu Leu Lys Leu Leu Glu
1 5

<210> 203
<211> 32
<212> PRT
<213> *Deinococcus radiodurans*

<400> 203
Gly Phe Gly Gly Val Gln Leu His Ala Ala His Gly Tyr Leu Leu Ser
1 5 10 15
Gln Phe Leu Ser Pro Arg His Asn Val Arg Glu Asp Glu Tyr Gly Gly
20 25 30

<210> 204
<211> 32
<212> PRT
<213> *Caenorhabditis elegans*

<400> 204
Gly Phe Asp Gly Ile Gln Leu His Gly Ala His Gly Tyr Leu Leu Ser
1 5 10 15
Gln Phe Thr Ser Pro Thr Thr Asn Lys Arg Val Asp Lys Tyr Gly Gly
20 25 30

<210> 205
<211> 32
<212> PRT
<213> *Pseudomonas aeruginosa*

<400> 205
Gly Phe Ser Gly Val Glu Ile His Ala Ala His Gly Tyr Leu Leu Ser
1 5 10 15
Gln Phe Leu Ser Pro Leu Ser Asn Arg Arg Ser Asp Ala Trp Gly Gly
20 25 30

<210> 206
<211> 32
<212> PRT
<213> *Archaeoglobus fulgidus*

<400> 206
Gly Phe Asp Ala Val Gln Leu His Ala Ala His Gly Tyr Leu Leu Ser
1 5 10 15
Glu Phe Ile Ser Pro His Val Asn Arg Arg Lys Asp Glu Tyr Gly Gly
20 25 30

<210> 207
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: PCR primer

<400> 207
catcctggac tcggcccacc tcctcaccga

30

<210> 208
<211> 9

<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: polypeptide

<400> 208

Ile Leu Asp Ser Ala His Leu Leu Thr

1

5

<210> 209

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 209

gaggaggtag ccgtgggccg cgtggagctc cac

33

<210> 210

<211> 11

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: polypeptide

<400> 210

Val Glu Leu His Ala Ala His Gly Tyr Leu Leu

1

5

10

<210> 211

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 211

ggctttccca tatggctcta caccgggctc ac

32

<210> 212

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: PCR primer

<400> 212

gcgtggatcc acggtcatgt ctctaagtc

29

09716964.112100